THE IRON AGE

Established 1855 New York, June 18, 1914 *Vol. 93 : No. 25*

The Case of the Inventor and the Public

Individual Returns from Patents Small in Comparison with the General Benefit—Liberality by Employers Pays

BY "MANAGER"

Some time ago Hon. Thomas Ewing, United States Commissioner of Patents, wrote for the Independent an article entitled "The Inventor and the Patent Office," answering in some degree the criticisms of the patent situation, which in common with all other spheres of human activity has recently received attention at the hands of the uplift movement.

It is no more than fair to say that such articles as I have seen criticizing the Patent Office were written from the point of view of the general public in the sense that their authors seemed to believe, although they did not specifically state it, that the inventor was a useful if somewhat erratic factor in our civilization, and that by smoothing the legal obstacles from his frequently troubled path he might produce greater benefits for the race.

This to my mind is a commendable point of view, although it seems to lay more stress on the good of the public than it does on the welfare of the inventor. This, however, is but a mild criticism and in comparison with the attitude of mind of the more advanced of our thinkers is deserving of all praise, and of the grateful recognition of inventors themselves.

THE "ADVANCED" VIEW OF PATENTS

The more advanced point of view which seems to be gaining ground with great rapidity is that an inventor is a monopolist who uses certain powers granted to inventors as a favored class by the unwise framers of the constitution to the detriment of the people as a whole. This advanced thought appears to hold that in legal language a patent is a contract without a consideration and therefore void. So much that we were formerly accustomed to consider as part of our inalienable rights has been attacked, and in many cases violently taken from us, in these recent years that it seems worth while to point out for the benefit of the unthinking what the thinking already know and understand, that so far from a patent being a contract without consideration, it is one which exacts a consideration amounting to the inventor's all, and requires that it be paid in advance.

HUNTSMAN'S SECRET

Those who have an interest in historical matters probably remember the story of Huntsman's steel; but for a clear understanding of the case we may briefly tell it. Huntsman, either a maker or user of tool steel, was greatly troubled by its irregularity, due to its production by the cementation process and the variations in carbon contents which could not fail to arise in that process. He conceived the idea that if a bar, or better several bars, of steel could be melted together in a single pot and properly mixed, the resultant mixture would be uniform and the heart-breaking variations of "temper" which occurred in blister steel would be eliminated. He proceeded to try out his process, history does not tell us with how many vexations and failures; but finally he succeeded, producing a steel which received almost instant approval at the hands of steel users on account of its uniformity and reliability.

His trade soon grew and he became a successful manufacturer; but in order to retain his lead it was necessary to guard his secret with jealous care. This he did, taking all those precautions of hiring only trusted workmen, barring the entrance of all outsiders and all the rest, which are the only recourse of those who have an industrial secret to guard.

His competitors naturally objected to seeing him walk away with all their trade, and finally one of them went in person, or in the person of an emissary, dressed as a poverty stricken wretch, on a bitter cold winter night and begged for admission to the works to prevent his being frozen to death. He was at first refused, but after long begging the night foreman let him in to rest on a bench not far from the furnace. There, seemingly cold and sleepy and overwhelmed with weariness, he sat and watched the workman break up the bars of blister steel, put them in a crucible, melt them down and

The Patent Situation

Monopoly is not a popular word, and as applied to patents it has created prejudices which ignore vital facts. "Manager," whose article in *The Iron Age* of February 20, 1913, entitled "High Cost of Living Is High Cost of Labor," was widely commented on, brings out in a striking way the inventor's side of the case. He argues that as employers who deal fairly with inventive employees find patentable ideas ready to hand for their mutual benefit, so the public may count on getting the largest results from a policy that rewards inventors on a liberal scale.

pour the homogeneous mass into molds, and from the resulting ingots hammer out the steel which was capturing all the trade.

With the departure of this counterfeit pauper the secret of Huntsman's steel was gone forever.

FROM STOLEN SECRETS TO PATENTS

The same general method of stealing industrial secrets can be, and not infrequently is, employed today, so that the wisest and most successful manufacturers have but few such secrets. If they make inventions they patent them and for a limited term enjoy their exclusive use. But on what terms? Merely this: that before the Government will consider the granting of a monopoly, even for this limited term, the inventor must surrender what is unfortunately too often his only property, his exclusive control of an idea, by explaining so fully and completely the nature and purpose of his invention that anyone "skilled in the art" can understand and practice it.

It is therefore quite true that before he receives any valuable consideration whatever from the government, he must relinquish his sole property, and at best the Government gives him back a monopoly of its use for a limited term. Too often we know what the actual result is. His revelation of his secret enables commercial pirates to "understand and practice" his invention only too well, and this they proceed to do without let or hindrance from the Government except as the inventor himself may pay the cost of stopping the piracy.

This, however, deals with a phase of the subject which is receiving concentrated consideration from inventors, patent attorneys and even from our national legislators themselves in such crumbs of time as they can spare from mending their political fences. That the Government actually makes money out of the inventors; that they pay in fees to the Government more than it expends in giving them service, a condition which does not exist in any other branch of the government; that the service is inadequate and that the pay of the men responsible for the decision of questions of the highest moment is so low that they cannot afford to devote their whole lives to the Patent Office, but after a few years in its service must turn to practice for themselves—are but details of the general situation. The important point is that the patent system as a whole shall not be destroyed by demagogues or by socialistic thinkers who consider that intellectual property should belong to all, irrespective of its origin.

WHERE EMPLOYEES' INVENTIONS FLOURISH

The general wisdom of this course is proved by evidence whose meaning can only be mistaken by the wilfully blind. For instance, those employers who treat their employees liberally in regard to inventions are those in whose plants valuable inventions are made and developed in almost countless numbers, while those shortsighted individuals who claim the right to all the inventions their employees may make while in their service are generally conspicuous by securing nothing under this claim. The reason for this is so apparent that it has been embodied in the fundamental law of this subject: if a man working for another conceives a new and valuable invention he may carry it around for years without showing any least sign, and this he often does if he believes that its revelation will not be beneficial to him. If, on the other hand, he believes that his employer will help him to develop it and give him an interest in the profits resulting from it, he goes to the employer and reveals his idea, which the broad-gauged type of employer immediately develops if it appears valuable, and the employee-inventor is rewarded from the proceeds.

Where the opposite system prevails the employee guards his secret carefully until he sees an opportunity either by the use of his own savings or in combination with trusted friends to develop it. He then leaves his employer and takes out his patent. It is impossible for any one but himself to say when he conceived the idea, and therefore difficult for his late employer to contest its ownership. For this reason the law now favors the point of view that inventions belong to the employee unless he was specifically employed with the idea of making or developing such inventions.

This all serves to prove what many already understand, that if the inventor thought he would have no opportunity to make anything for himself out of this child of his brain, he would carry the secret with him, not infrequently to his grave, and the race would be the poorer, perhaps for generations.

HOW THE PUBLIC HAS SHARED

It is not alone on the ground of justice to the individual that the intelligent would see the inventor protected in his right to his property, but also for the benefit of the public itself; in fact, for selfish reasons much more on the latter than the former account, because it is admittedly unwise to kill the goose which will probably lay golden eggs.

Even those who denounce most fervidly the conditions of modern life admit that there has been a vast improvement in these conditions in the last hundred years—an improvement of 100 per cent., many believe, in the average ease and comfort of living; and those who do not admit this would probably do so if they could be compelled to live under the conditions of those good old times for even a brief period. This means that we have now a greater production of the necessities of life with less labor—the release of mankind from slavery to the soil.

How has this come about? By the blatant misstatements of the labor leader? By the "race consciousness" of the uplifter? By the law-making of the selfish and self-seeking legislator?

Not for an instant. It has come by the substitution of mechanical power for man power, by doing with power-driven machines what formerly required the heartbreaking toil of human beings, by making the coal vein, the oil well and the water flowing to the sea the hewers of wood and drawers of water, the bondservants, in short, of the whole human race.

And had the labor leader, the uplifter and the legislator a share in this enslavement of nature for the liberation of man/

Not by the lifting of a finger. Either they stood idly by as spectators, or when it seemed to threaten their personal interests opposed it bitterly. The inventor did the work, frequently with no reward to himself, seldom with an adequate one and almost never with one comparable to that obtained by the banker, the manufacturer, the merchant or the successful professional man, but laboring always in the hope of a suitable reward.

It has been said quite recently that the wealth based on the inventions of a single inventor, Edison, now totals over six billions of dollars and employs over a million men. Compare this vast accumulation and production of wealth with the moderate fortune which Edison himself has obtained from his work, and can even the most radical say that the world as a whole can afford to begrudge the inventor his modest proportion of the total value of his inventions?

Engineering Schools in Industrial Service*

A 6-yr. Development Now Involving 3000 Students Teaching English to Foreigners — Advantages to Workman, Student, Employer and Community

BY JOSEPH W. ROE†

A social force has been at work in our engineering schools for the past few years which materially affects the attitude of students, on leaving college, towards working men. In the winter of 1907-1908 some engineering students of the Sheffield Scientific School at Yale started on their own initiative an activity which for want of a better name, has been called industrial service work. It consisted of a study of welfare activities, living and working conditions in American industries, and a definite attempt to render some useful service to workingmen in the city. As a large industrial center, New Haven has many thousands whose greatest need is a knowledge of the English language. It was felt that to help meet this need was the most practical service the students could render. A system of instruction in English was evolved, based on the familiar phases of everyday life, which did not require a knowledge of the foreign language on the part of the teacher. Groups were organized in various parts of the city wherever they could be gathered, the general plan being that the students should go to the men rather than to attempt bringing the men to any school or institutional buildings. The plan worked well from the start. The classes were full and many newly arrived immigrants were reached who would not have come near a public night school.

The following winter a number of other engineering schools undertook a similar work with similar success. Under the leadership of the industrial and student departments of the Y. M. C. A. it has spread rapidly throughout the country until now, only seven years later, more than 3000 students are engaged in it and are coming into contact with about 50,000 workmen.

The service is not, however, confined to instruction nor to foreigners. Any sound basis of contact is utilized. The classes or groups are kept small, not over five or six men to a teacher, in order to insure the element of personal contact. The work is done independently of the college curriculum, on a voluntary basis, and without pay, as this basis is by far the best in its effect on the student. In some cases the faculty has coöperated by taking over that portion of the programme relating to speakers and has arranged a course of industrial lectures for all upper classmen. The advantages of industrial service work are felt by the employer, the workman, the student and the community.

PERSONAL ATTITUDE TOWARD WORKMEN ACQUIRED.

Employers, some of whom were at first critical, welcome it for its direct benefit and support it by giving access to the workmen, by furnishing places for teaching and in many cases paying the small necessary expenses. They see, too, its effect on the student.

More than half the value of an executive engineer lies in his capacity to understand and work with his men. No amount of technical proficiency can make up for the absence of it. One of the strongest criticisms of the college-trained engineer is the unconscious attitude of assumed superiority which he often has, for a time at least, after graduation. It seriously limits his usefulness and his capacity for learning. The ability to understand and to work with men is the most valuable trait he can have. This our colleges, as colleges, cannot teach, for it is based on a knowledge of human nature and there is no textbook on human nature. It can be learned only by personal contact, and genuine personal contact is possible only on a basis of mutual respect and friendliness. The students are learning much more than the possibilities and limitations of welfare work. They are acquiring a personal attitude toward fellow workmen which starts out right.

It is possible to give here only a few expressions of how this work is held by students of the stronger type. One says: "It's a wonderful, and sometimes a humiliating revelation to a fellow to get up against some of these foreign men. It just makes a fellow readjust a good deal of his previous thinking." Another, one of the best known college athletes of the day said a few months after graduation: "Remembering what I learned in this movement at Yale, when I became foreman I treated my gang of Italians as men and not as dogs, and it was really pitiful to see the way they returned the little kindnesses I showed them. Each day I was met with cheery words of greeting. When the job was complete, the men came to me in a bunch, thanked me for the fair way I had treated them and said they would like to work for me always." Another, a football captain, said a short time ago: "This industrial work is the livest thing that's struck college since I've been here. It's a real job and it's practical. Everyone of us who goes into it is bound to acquire an experience in dealing with men which the curriculum cannot give, and we need it."

WHERE THE COMMUNITY PROFITS

The advantage to the community needs but little emphasis. When one considers the type of Americanism with which the immigrant first comes into contact, it is no wonder that his social standards remain low. The only Americans, whom many a Pole or Italian meets, are the saloon keeper, the ward heeler and the grafter. Contact with clean-cut, wholesome, educated college boys opens up to him a type of Americanism which he sees in no other way. It raises his standards and kindles his ambition. The men come to the students with all sorts of questions which indicate a hunger for information and improvement.

As the industrial service movement has developed it is quite distinct from ordinary social welfare work. It has two clearly defined objectives. The first one is immediate benefit to the laborer whom the student may be teaching; the second, less obvious, but main purpose is the subjective effect upon the student himself, the developing of an attitude of mind, and a knowledge of the social aspects, the responsibilities and the opportunities of his engineering profession. While the latter should

*From a paper presented to the American Society of Mechanical Engineers, St. Paul, Minn., June 17.

†Assistant professor, Sheffield Scientific School, Yale University, New Haven, Conn.

not be over emphasized to the student it is never lost sight of by those directing his activities.

Such briefly is the development and nature of industrial service work. In appraising its value it is well to look at it broadly. The work which these

A Noon-day Class in a Foundry in First Aid to the Injured. Practically All of These Men Are English Speaking

students are doing is part of a general trend, of a changing of social standards; and of a development away from the industrial individualism of a hundred years or even fifty years ago. The probability is that this tendency will increase rather than diminish during the coming generation.

Industrial history shows nothing more clearly than the fact that while tools of production make high social development and physical welfare possible, they by no means insure them. The series of inventions of Hargreaves, Arkwright, Eli Whitney, Watt and other great inventors from 1760 to 1800 resulted in a tremendous readjustment of social conditions. In England, where this change was felt first and most severely, tens of thousands of artisans found their handicrafts supplanted. They drifted into the new industrial centers and found work as best they could. The resulting conditions are a matter of history. The industrial leaders had little or no sense of responsibility for conditions of labor and living which would not be tolerated today. Operatives were crowded together under unsanitary and dangerous conditions, working hours were long, and wages were governed solely by the supply and demand of an overcrowded labor market. This indifference on the part of the employers was soon met by violence and industrial warfare. At length, from various reasons, conditions began to adjust themselves. Under the leadership of such men as Lord Ashley, Robert Owen, an industrial conscience came into existence, and year by year, partly through labor legislation, partly through labor unions, partly through voluntary improvement by the employers, conditions have steadily improved, and are now better than before the introduction of machinery.

The situation was never as acute in this country as it was in England, but we know that even to-day we have in America industries with the most highly developed machinery where child labor and dangerous or unsanitary working conditions still exist. While conditions as a whole are by no means ideal, there has come a general acceptance of the fact that reasonable hours, good light and air, safety, and a fair wage are best not only for the worker but for the employer. Men do not agree, by any means, as to just what constitutes reasonable hours and a fair wage; but none now deny the general principle.

At the beginning of this century a new force came in, the rapidly developing art of industrial management. It is still in its infancy, yet enough has been done to show that old methods of management have been wasteful and that great increases in production are possible when the right methods have been found and put into successful operation. The invention of machinery vastly increased the workman's production by giving him new and efficient tools. The new force opens up a further increase, through the higher efficiency of the workman himself and of methods of industrial management. The effect in both cases is the same. The advent of machinery produced a profound social readjustment accompanied by widespread distress and friction. The readjustments due to the application of improved methods of management will not in all probability be so great, certainly not so drastic. Standards are far higher today than when machinery was first introduced a hundred years ago and workmen now have means of defence. Moreover, the social changes possible are probably not as radical or far reaching as in the earlier development.

The development and application of the highest types of industrial management, however, is going

Teaching English at a Construction Camp. The Lesson is Posted on the Side of the Car. The Breaking Down of Class Feeling is Clearly Present

to be difficult and delicate work, if the results are to be made a permanent benefit to society as a whole. Those who personally direct this development will largely determine the efficiency with which "efficiency" itself is applied. If the attempt is made by those in charge to seize all the benefit of the improved methods and to crowd the advantage of the employer, they will either defeat or indefinitely postpone the advance. They must be experienced men, wise, fair, thoroughly conversant with possibilities and free from sentimental idealism. This means not only a knowledge of machinery, systems, and time study, *but of human nature and the rights and real needs of industrial workers.*

The executive engineer will be at the focus of this situation. He alone is in direct personal contact with the two great elements involved, capital and labor. His thorough understanding of both of these forces will prove one of the greatest elements in progress. If the man in actual charge has little knowledge of, or sympathy with, the workman, serious missteps are certain. If on the other hand to a thorough technical training and knowledge of the resources and responsibilities of the employer, he adds an attitude of fairness and friendliness, and a personal understanding of the workman involved, the new force will work out to the good of all concerned. Scientific management offers an op-

portunity to pay better wages, but it will require strength and wisdom to apportion the economic gain fairly, and to maintain a just distribution of it.

FAILURES IN WELFARE WORK

Welfare work in various forms has been going on for many years, ranging all the way from improvement in the small details of working conditions to the planning and building of whole model cities. Some of these enterprises, conceived in a spirit of genuine good will, have met with no response from the workmen and in spite of the great sums of money and much thought spent on them, have ended in bitterness and disappointment. In other cases welfare work has been developed quietly and wisely, each move being tested out as it was tried and has deeply influenced the lives and social standards of the whole community. In the record of these enterprises there is a glaring discrepancy of success and failure. Most of the failures have gone onto the rocks from violation of the fundamental principles of human nature. About some there has been a fine flavor of condescension; others have been made an advertisement; others have been imposed upon workmen by authority. A workman, no matter how crude his social standards, has a right to his own personality and sooner or later he will assert it. As one of their leaders put it to the writer: "Some of these employers roll their good intentions into a big bolus and jam it down the workmen's throats saying 'Here, take that; it's good for you.'" No welfare work will ever be effective unless it is preceded by a square deal, is wrought out gradually and patiently and is the product of mutual confidence, experience and good sense.

While thousands have been invested in welfare enterprises, we know that the purpose behind them is being accomplished in scores of industrial organizations, without any special equipment, by the personal influence of some man or men in charge.

An Evening Class in Practical Mining. The Teacher in Charge is a Young Assistant Superintendent Who Became Interested in Industrial Work While at Yale

These men seem to have a genius for understanding and developing the best in the men under them. They have no fixed rule or system. It is a question of attitude and personality. They create an atmosphere of confidence instead of suspicion and distrust. Their influence permeates a whole factory, kindling ambition and developing better workmen and better industrial conditions. Such men can accomplish wonders without any welfare equipment. Given a welfare equipment they make it successful and beneficial to all. Their value to the employer, to the workman, and to the community can hardly be overestimated; the new art of management under the direction of such men as these will prove a permanent success. The development of just such men as these is the aim of the industrial service movement.

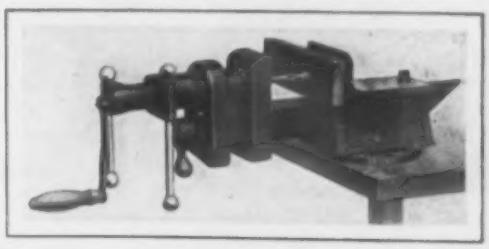
We have tried to sketch briefly the spirit of this movement, its main activities, and its relation to the general industrial situation. It seems sound. There are at present about 30,000 students in the engineering courses of the various schools and colleges throughout the United States. Of these, perhaps 5000 to 7000 graduate each year. About 20 to 25 per cent. of the students become enough interested in this work to get the benefits of it. What will it mean to the employer and workman in the next generation to have coming into the management of industrial enterprises 1000 or 2000 men a year who inspire good will and confidence and have the right point of view?

So far the industrial service work has been guided by experts from the industrial and student departments of the international committee of the Y. M. C. A. These men have given it special study and have directed its activities. They have kept it free from fads, and its rapid growth is perhaps the best evidence of the wisdom with which it has been directed. Although the motive which lay behind it was a religious one, it has attracted many men who took but little interest in the ordinary forms of religious activity. Many of these have found in the progress of this work that this motive and the unselfish social one are not so far apart.

Combination Vise and Drilling Machine

A combination of several useful tools in one, which is known as the Trident drill press combination and multi-vise, has been brought out by the Diamond Expansion Bolt Company, 90 West street, New York City. This tool, which consists of a vise, an anvil with a cutting hardy and a drilling machine, all mounted on a swivel base, is claimed to be the only tool of this character on the market, where the work can be securely held between the vise jaws while it is being drilled, the two actions being independent of each other. The drilling machine can be detached, and there is a quick releasing action.

When there is no drilling work to be performed, it is possible to remove the drilling machine instantly, thus leaving the vise and anvil ready for service. All sizes of ordinary taper shank drills for drilling metal and wood can be employed. There is a quick releasing action, permitting the drill to be drawn from the hole by a quick sliding movement, which, it is pointed out, makes it unnecessary to unscrew the feed screw. The complete tool weighs about 60 lb., and can be removed from the work bench, wagon or other support by simply releasing the nut from the swivel bolt.



A Combination Vise, Drilling Machine and Anvil Mounted on a Swivel Base

BEARINGS FOR ROLLING MILLS

Minimizing Journal Friction in the Case of Rolls for Cold Metal

The following has been taken from an article in London Engineering of June 5: The rolling-mill, especially those smaller sizes which are commonly used for cold work, does not offer great opportunities for variation in design. In the older form of mill the bearings carrying the rolls are very crude indeed, with the result that the brasses wear very rapidly and require frequent renewal, and also that the power absorbed in friction is a very large proportion of the total power required by the mill. Both these conditions mean increased working costs, and it would appear to be worth while to consider the design of the bearings with a view to reducing these losses.

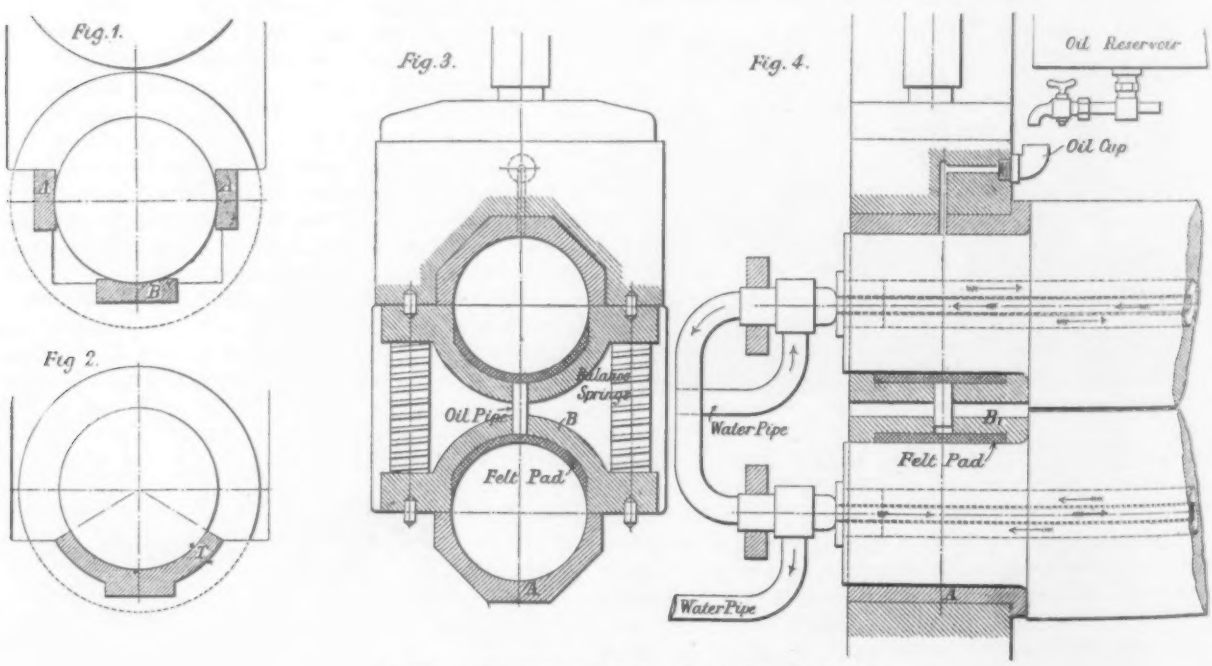
As will readily be understood, the direct pressure on the roll-neck bearings is very considerable indeed, and this is especially the case when rolling very thin metal, as it is then necessary to screw down the rolls until great pressure is obtained between the two, before the metal is inserted. This initially puts a very heavy load on the bearings before any useful work is done, and when the metal is introduced between the rolls, even if only a few thousandths of an inch in thickness, this load is increased to a very serious extent. Now with all bearings it is essential, in the first instance, to see that there is ample bearing surface to carry the load, and also, with the exceptionally heavy pressures, such as are met with in a rolling-mill, that there is provision for carrying away the heat which must inevitably be generated.

Fortunately, under ordinary circumstances, the speed of such rolls as we are dealing with is low, usually 50 ft. to 60 ft. per minute at the roll surface. This low speed makes high bearing pressures permissible, and with mills of very modern design the pressure per unit area of bearing surface must be at times at least 4000 lb. per square inch. The effective bearing area is, of course, dependent on the diameter of the roll-necks and the length of the bearing brass. It is not advisable to have the roll-necks too large, as this would mean a higher velocity of rubbing between the surfaces in contact, and, consequently, a higher rate of heat generation. The minimum diameter possible is a question of strength, and, with the chilled cast-iron rolls in common use, is usually about 0.7 of the roll diameter; this is generally satisfactory. It is, however, surprising to note the comparatively short length of such bearings. The following figures give the bearing proportions for various small and medium-sized modern English mills for cold rolling:

Diameter of rolls, in.	Length of roll barrel, in	Diameter of roll-neck, in.	Length of roll-neck, in.
8	8	5½	4¼
9	9	6	5
10	10	7	6
12	12	8	7
16	16	11	9½
18	18	12	10½

The lengths of the roll-barrels given above, of course, vary considerably in proportion to the diameter, but this dimension does not influence to any extent the size of bearings necessary. The length of roll-neck given is the effective bearing length, i. e., the length of the bearing brass. It will be noted that the ratio of length to diameter of roll-neck is less than 1, and, in the writer's opinion, the ratio could be increased with very beneficial results. If, for example, the bearings were made of a length at least equal to their diameter, the bearing surfaces, as compared with the dimensions given above, would be increased 15 to 20 per cent., with a corresponding decrease in bearing pressure per unit area. As a matter of fact, it would appear that the length of bearing has usually been decided by the thickness of the housing casting, the total length of the bearing being the depth through the housing plus the thickness of the flange of the brass, and usually a slightly raised facing on the inner side. To increase this housing section throughout would be adding unnecessarily to the weight and cost of the mill, but a deeper facing could be arranged without difficulty. In doing this care should be taken to allow ample radial depth to take the load, which is bound to be greatest on the inner side. Equal facings on both sides of the housing would be best.

Increasing the length of a bearing of a given diameter has another advantage, in affording a larger surface exposed for radiation of heat. It must be noted that when comparatively long bear-



Design of Bearings for Rolls Working Cold Metal

ings are adopted, it is imperative that they should be carefully bored, fitted, and bedded to the roll-necks, to ensure an even bearing over the whole length. It is necessary to emphasize this point, as even now some users fit brasses which have not been machined at all, leaving the rolls to wear themselves into a good bearing. However, up-to-date mill builders invariably carefully machine and align the brasses. Mill brasses are usually of gun metal, and should be of good quality; Admiralty mixture or, better still, phosphor bronze should be specified. A little extra in first cost will be found to be true economy, owing to the longer life obtained and the less frequent stoppages for renewals.

For larger rolls, when, owing to the large size and weight of the brasses, the cost of replacement is a considerable item, and a large proportion of the metal is wasted and thrown on the scrap heap, there is reason for recommending the lining of such bearings with white metal. In the writer's opinion a gun-metal shell lined with a good anti-friction metal is the ideal bearing for rolls. To save expense the white metal might be run into the casting of the housings and chocks without a loose shell; it is, however, an advantage to have the bearings independent of the main castings for convenience in relining. Spare shells ready lined can be kept, and the renewal of bearings thus be effected in a very short time. There is no difficulty whatever in getting a white-metal alloy which will withstand the heavy bearing pressures without squeezing out; at the same time there is a prejudice among some mill users in this country against its employment. Their objections cannot, however, be supported, and must be put down to a conservative habit of mind. White-metal mill bearings are very common in America, and many large and important British mills have adopted them entirely.

Coming to the form of bearing brass in the older English mills it is quite usual to see flat strips of gun metal, three to each journal, as shown in Fig. 1, the two side-pieces A, A being fitted to take the side thrust, and adjusted by means of metal packing at the back to take up wear. The bottom piece B, of course, takes all the bearing load, and is left to wear down to a bearing. The unsatisfactory nature of this design will be obvious.

Usually the brass is now made circular in form, partially encasing the roll neck, and a satisfactory design of brass of this type is shown in Fig. 2. In this case the brass encircles more than one-third of the circumference of the journal, and is provided with a projection or key fitting a recess in the main casting, to prevent turning in its bored seating. The thickness T will not be less than $\frac{5}{8}$ in. for the smallest sizes, and should never be less than $0.07\ d + \frac{1}{4}$ in., where d is the diameter of the roll-neck. A substantial flange is provided on the inner side to take any end thrust, and is usually about equal to T in thickness. Bearings of this form are in very general use, and if of sufficient length, well machined, and properly fitted to the journal, they give satisfaction.

An obvious defect in this design will at once be noticed by an engineer—namely, that the upper surface of the journal is exposed, and every facility given for the accumulation of dirt and grit, which must be carried between the bearing surfaces, and so cause rapid wear and increased friction. It would seem advantageous to enclose the bearing entirely or to fit something in the nature of a dust cover on the unloaded sides of the bearings. This, however, involves consideration of the question of lubrication and cooling. The majority of mills at work in this country having bearings similar either to Figs. 1 or 2 are arranged to have a stream of water directed on to the roll-necks to dissipate the heat generated both by bearing friction and that

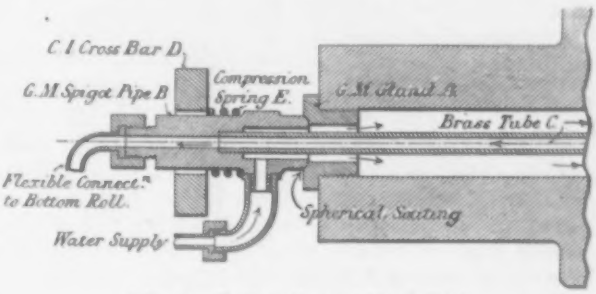


Fig. 5—Section through Top Roll

resulting from the molecular friction caused in displacing the metal rolled. This water supply, led through the top chock, comes into actual contact with the journal surfaces and flows away through drains to waste. It must be admitted that this method effectively disposes of the heat, but at the same time it also entirely interferes with any proper system of lubrication.

The alternative is to adopt a design which has been long in use on the Continent and is now coming into favor in this country. This entirely encloses the bearing, provides a proper system of automatic lubrication, and arranges for the cooling of the rolls by means of circulating water through the center of the rolls. Figs. 3 and 4 illustrate this type of bearing with the water-cooling system. It will be seen that A is the gun-metal or phosphor-bronze half bush, and B the cast-iron cover, these two together enclosing the bearing. The covers of the top and bottom rolls respectively are kept in contact with the journals by means of springs, which also serve to take the weight and balance the top roll.

A recess is formed in each cover, containing a felt pad, which is kept saturated with oil by means of a drip feed from a small oil tank supported between the housings. The oil, entering cups in top chocks, is led around the top half bearing by oil grooves to the felt pad in the cover and overflows through the connecting oil pipe into the pad in the cover of the lower roll. This method of lubrication has been found to be the best possible to suit the conditions of working, ensuring a film of oil over the bearing surfaces. The lubrication requires little or no attention, the bearings are kept free from dirt and grit, with the result that the life of the brasses is extended considerably, and the horsepower absorbed by the mill on heavy loads materially reduced. It has been found that, by converting the bearings of an old mill to the above type, the horsepower consumed has been reduced nearly 20 per cent.

Details of the water connection to the rolls will be made clear by reference to Fig. 5, which shows a section through the top roll. The steel roll is bored through the center, either stopping short of the inner end of the roll or bored right through, and closed at that end with a screwed plug. A gun-metal gland A is screwed in the outer end, having a spherical seating for the gun-metal spigot pipe B, which has a spherical nose to suit. A water-tight joint is made by the spigot pipe being pressed into the seating in the roll end by means of a steel compression spring, which bears against the cast-iron cross-bar D. The brass tube C is sweated into the spigot pipe, leaving, as shown, an annular space round the tube for the water supply.

Results of Applied Scientific Management*

What a Few Years' Records Show as to Better Product and Less Cost, Higher Rate to Employees and Steady Employment

BY GEORGE DE A. BABCOCK†

In Fig. 3 is shown the summary of the works effort over the period of May, 1908, until the end of March, 1914. To date the highest total of cars produced occurred in 1909-10, when the models were small and relatively free from complications of electrical equipment, fine accessories, etc. It was also the period of the introduction of the automobile and altogether was a period of heavy production.

However, mechanical equipment and scheme of control of the industry at the time necessitated an extraordinary effort to accomplish the results. This peaked very seriously and at an alarming rate. The "planning and supervising expenses" behaved in the same manner, and it was altogether a period of violent peak load. Since that time the supervising and direct labor expense has remained practically constant, over not only the continuation of that season's product, but also over the time of building practically a new car in all of the essential mechanical details, beginning with September 1, 1913.

The extraordinary rate of fall of "producing hours per car" of the 1914 car, as shown, is due to

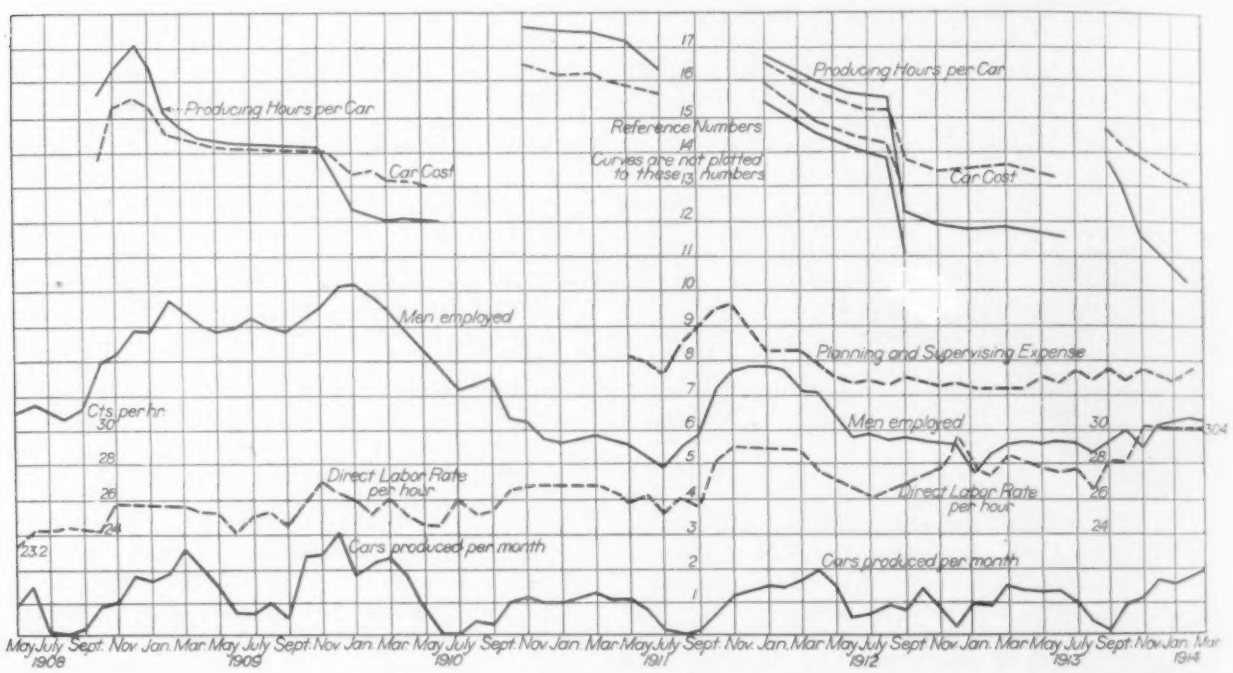

Producing Hours per Car
Car Cost
Men employed
Cts. per hr.
Direct Labor Rate per hour
Cars produced per month
Reference Numbers
Curves are not plotted to these numbers
Planning and Supervising Expense
May July Sept. Nov. Jan. Mar. May July Sept. Nov. Jan. Mar. May July Sept. Nov. Jan. Mar. May July Sept. Nov. Jan. Mar. May July Sept. Nov. Jan. Mar.
1908 1909 1910 1911 1912 1913 1914

Fig. 3—Nearly Six Years of Manufacturing Effort. The Later Periods Indicate the Degree of Realization Toward Minimizing the Number of Hours per Car and Steadiness in the Numbers of the Employed as Well as Increases in Labor Rates

is shown by a study of the "producing hours per car" curve and the number of "men employed." The "producing hours per car" was found by dividing the direct labor car cost of a particular lot of cars by the average direct labor rate over this period of production. The large dip in 1910 of the "producing hours per car" can be accounted for by the fact that a considerable amount of production was performed on expense orders, which costs did not appear in the direct labor car cost.

A further study of the curve will show that the number of men employed have been relatively constant since July 1, 1912, although the number of cars produced has varied considerably. The extraordinary drop in the "producing hours per car" over this period was caused by the new control plan of lot production which went into effect on February 1, 1912.

The 1911 effort in number of men employed the absolute control of our productive effort in bringing a new model, in a matter of two or three months, into the general class of low cost, although starting initially with somewhat of a high cost.

This control has been due to two prime reasons: 1, a practically perfect plan of supervision; 2, simplicity of product; 3, new and more applicable machinery and tools.

At the time of the drop of the "producing hours per car" of 1913, we had no change of any kind in form or in number of models to produce (and we were producing four chassis types) or any other feature except the lot plan of production. The shipping of the product has practically always followed close on production and we have consistently tried to produce the maximum quantity that our works is capable of.

Over this period from 1908 to 1914 the direct labor rate per hour is shown starting in 1908 with 23.2 cents per hour (average for all men employed in the motor car department) up to 30.1 cents per hour in 1914. The raised flat portions are caused by premium work and steady earnings under it. The broken portions are due to an irregular flow of work with consequent uncertain premium earning-

*Third installment of a paper to be printed in these columns substantially in full, presented to the National Metal Trades Association, Worcester, Mass., April 22. The first part, printed in the issue of June 4, told of the conditions which existed when it was determined to institute scientific management. The second part, printed June 11, covered largely the first steps taken.

†Production manager, H. H. Franklin Mfg. Company, manufacturer of the Franklin motor cars, Syracuse, N. Y.

In 1904 the average rate per hour figures 20 cents.

The relation of the direct labor and expense accounts is well shown by Fig. 4. It will be noticed from the direct labor and overhead expense curve that the moneys paid into the community have remained relatively constant from May, 1912, until the present time, although the number of producing hours per car as shown by Fig. 3 has been materially reduced, i.e., we are maintaining continuously a full plant production and our savings arise from economies through having the shops filled with new product. One of the common ways of studying the relation of direct labor to indirect labor is by noting the percentage, and as large expense is frequently discussed with the installing of scientific management, it is interesting to note how little this comparison is direct. Here it will be noticed that the productive quantity and rate of cars for 1909-14 are very similar except at slightly different periods. The number of workmen employed in 1909 is high and the rate of acceleration is high, with a very irregular employment of men as indicated by the number of points which fall away from the average line. The 1914 number of workmen is low, showing steady employment and uniform acceleration for practically the same effort. The 1909 wage rate and the 1914 wage rate show a very marked difference as well, also, as does the producing hours per car.

Of the factors discussed for this period it will be noticed that production effort for a better product has been materially reduced; that the rate of wage

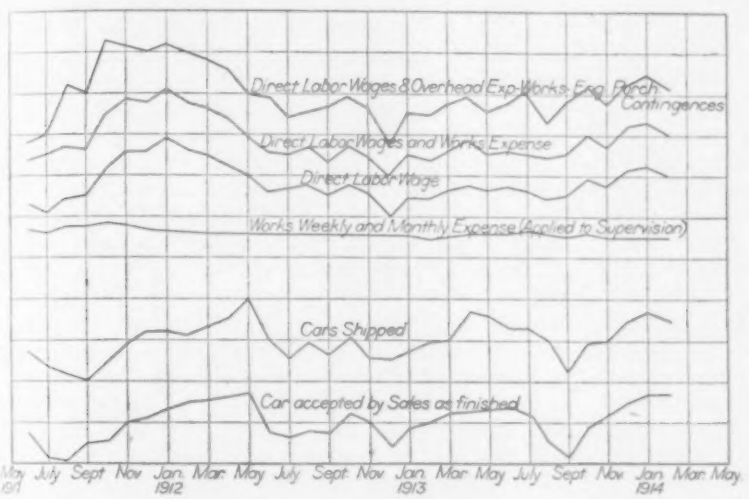

Direct Labor Wages & Overhead Exp. Works Exp. Pay Roll Contingences
Direct Labor Wages and Works Expense
Direct Labor Wages
Works Weekly and Monthly Expense (Applied to Supervision)
Cars Shipped
Car accepted by Sales as finished
May July Sept Nov Jan. Mar May July Sept Nov Jan. Mar May July Sept Nov Jan. Mar. May
1911 1912 1913 1914

Fig. 4—Relation Between Labor and Expense Accounts, Showing also Constancy of Money Paid into Community

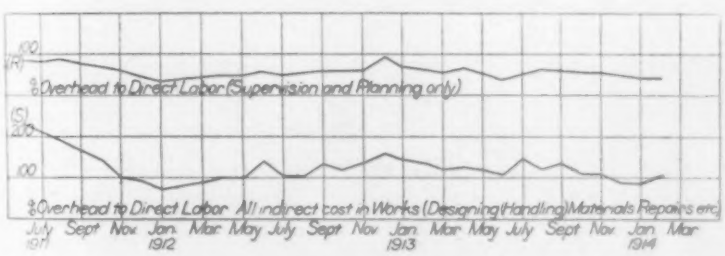

(R) % Overhead to Direct Labor (Supervision and Planning only)
(S) % Overhead to Direct Labor All indirect cost in Works (Designing Handling) Materials Repairs etc.
July Sept Nov Jan. Mar May July Sept Nov Jan. Mar May July Sept Nov Jan. Mar
1911 1912 1913 1914

Fig. 5—Chart Giving an Insight into the Expense Incurred by Planning and Supervision Work

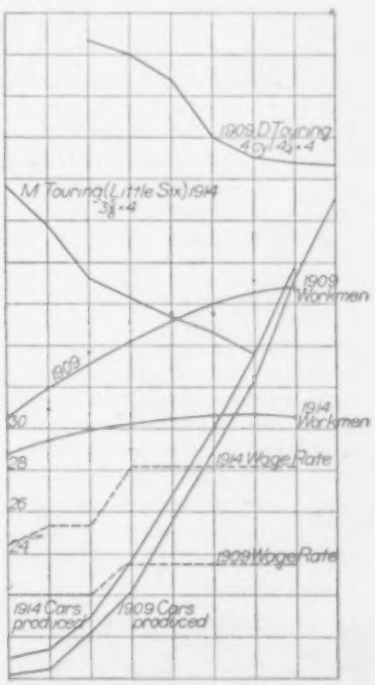


Fig. 6—The Manufacture of Two Cars Compared. For Substantially the Same Number of a Better Car, Less Workmen Are Needed with Less Irregularity in the Variation in the Numbers Employed and a Higher Wage Rate Obtains

apparent influence the cost of this work has had on expense. In Fig 3 the curve of planning and supervising expense is very rough over the months from May, 1913, to March, 1914. The cause of this is that expense was added to plan for some particular saving and as soon as consummated the expense again dropped.

In Fig. 5 is shown the percentage of overhead or indirect labor to the direct labor. It will be noticed that since January, 1912, it was approximately 125 per cent., although at the latter end of the period somewhat under this. The lower curve in Fig. 5 shows the ration of all indirect labor, including planning, engineering and all other expense that is applied in the preparation and production of the product. This includes all repairs to buildings, depreciation, scrap, tools, etc. The upper curve shows the part of this expense which is created strictly by the planning and supervising departments, but does not include engineering and others mentioned below.

By reference to Fig. 3 it will be noticed that the curve of number of cars produced monthly in the beginning of the 1909 period and that for the 1914 period to date are closely comparative. In Fig. 6 of workmen has been materially increased; that peaks of labor employment have been eliminated, and the price of the car to the trade has been very materially reduced. As mentioned three principal things stand out as the markers for the cause of what has so far been shown: one of these is a somewhat simpler problem in the combination of parts due to one mechanical chassis in place of three.

(To be continued)

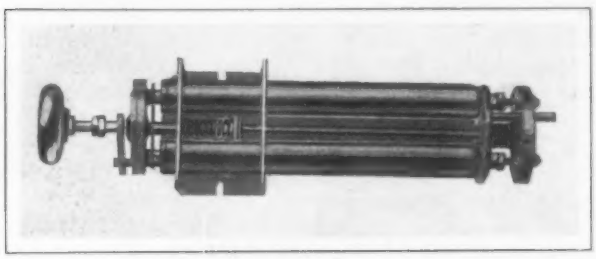
Russian Meeting of Testing Engineers

The Seventh Congress of the International Association for Testing Materials will be held under the patronage of the Czar of Russia, in St. Petersburg, from August 12-17, 1915. Four days will be devoted to the discussion of the most important problems on testing materials. After the congress extensive excursions in the interior of Russia have been arranged, including visits to iron mines and iron and steel works.

Some thought-inspiring observations on business efficiency are made in the last issue of Crane-ing, a little publication gotten out by the Cleveland Crane & Engineering Company, Wickliffe, Ohio. A copy of the issue can undoubtedly be had for the asking.

Speed Regulator for Induction Motors

The Allen-Bradley Company, Milwaukee, Wis., has recently developed a speed regulator for slip ring motors. The particular advantage claimed for this type of regulator is that a speed variation with a large number of steps is secured, and the variation is entirely independent of the load on the motor.



A Speed Regulator for Slip Ring Induction Motors Providing the Variation by Compressing Carbon Disks

The regulator is constructed along the same general lines as the company's carbon compression resistances. These devices consist of a series of carbon disks, mounted on a rod in a steel tube, the disks being thoroughly insulated from both the rod and the tube. The change in the resistance and the corresponding variation in the speed of the motor is obtained by turning a handwheel, which gradually compresses the carbon disks. One of these units is furnished for each phase of the supply circuit, and the pressure applied is equalized by mechanical means so that the phases are not unbalanced. It is emphasized that this type of resistance is practically indestructible and is not affected by the action of moisture or corrosive fumes. It is also possible to obtain an infinite number of speeds with the carbon pile resistance, instead of limiting the variation to the number of contacts on the faceplate of the regulator. A slight turn of the handwheel effects a change in the speed of the motor, so that it can be adjusted to suit the operating conditions and kept at the most suitable point.

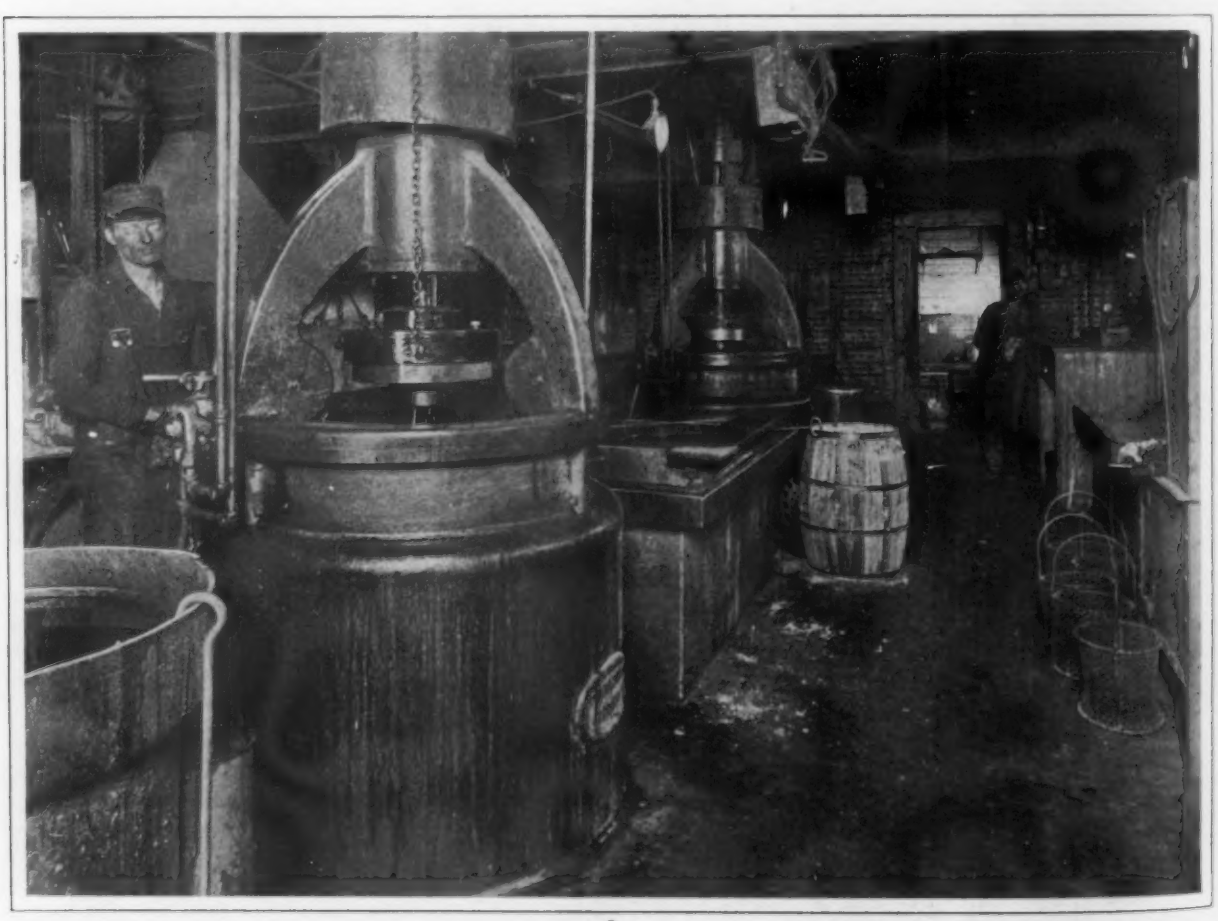
The regulator is of compact design, as will be noticed from the accompanying cut, and is of light weight. It is built in sizes up to 10 hp. for regulating the speed of fans and up to 5 hp. for machine duty.

GEAR TEMPERING MACHINE

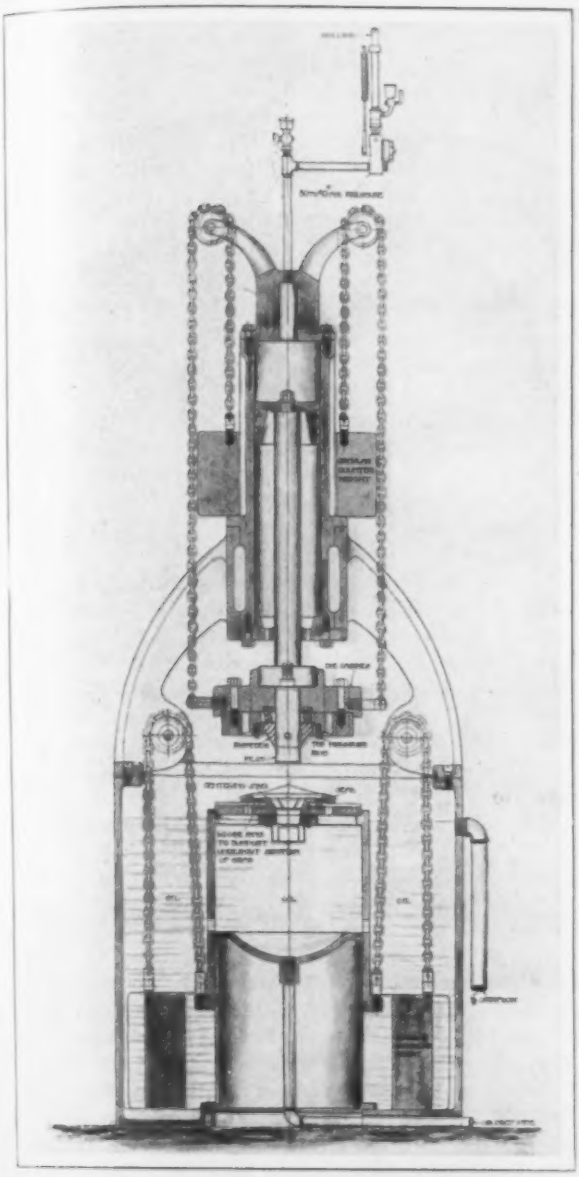
A Mechanism for Preventing Warping of the Blanks During the Operation

For holding gear blanks true in the tempering process, the New Process Gear Corporation, Rochester, N. Y., has installed gear tempering machines built by the Gleason Works, Rochester, N. Y. While especially designed for automobile bevel driving gears, the machine can of course be used on work which has a tendency to warp when tempered in the ordinary way. The only requirement is that the gears to be handled by the machine shall have been turned true and interchangeable in face angles and backs to correspond with the standard dies.

In tempering the gear the pilot end of the plunger enters the split centering bushing and brings the bore to approximately the correct central position. After this has been done the taper sleeve or expander on the plunger enters the tapered bore in the bushing and expands it to fit the bore of the gear after it has been expanded by the heat. It is pointed out that in this manner correct centering of the blank is secured. The springs at the rear of the expander then close, and apply pressure to the bore of the gear, which is relied upon to keep it from getting out of round. The upper die is then



View in the Plant of the New Process Gear Corporation Showing a Battery of Bevel Gear Tempering Machines



Sectional Elevation Drawing of the Machine

brought down to bear on the face of the gear and web to prevent it from warping out of plane. The pressure in the air cylinder is increased until it exceeds the circular weight supporting the lower die plate. The gear is then forced under the oil and the air pressure is maintained until the gear cools. The same arrangement that is relied upon to keep the gear central and round in the first part of the operation performs the same function while the gear is contracting.

Both the upper and lower die plates are cored out and have grooves in the surfaces, so that oil will circulate freely. It is emphasized that the gear comes out of the tank uniformly hardened to the same degree as when tempered in an open tank. Pipe connections provide for the circulation of oil from an outside reservoir or cooling system, a feed water heater being recommended as a radiator for cooling the oil. In the builder's hardening room the fuel oil is circulated in the outer jacket of the radiator, although water might be found more convenient under ordinary shop conditions.

The air pressure is controlled by a hand-operated valve, the same as a pneumatic hoist. It is stated that an air pressure of 60 lb. is sufficient to force the gear under the oil. While this pressure is sufficient for tempering gears of light section, a pressure from 80 to 90 lb. is recommended for heavier gears. With the maximum air pressure the pressure on the gear is increased to 4000 lb. by forcing the drum against the bottom of the machine. To supply the quantity of air required for tempering the gears a compressor having a capacity of from 6 to 8 cu. ft. of free air per min. and a storage tank having a minimum capacity of 10 cu. ft. is sufficient.

The capacity of the machine ranges from 16 of the largest bevel driving gears per hour to double that number for small gears. The section of the gear, of course, exerts some influence on the capacity of the machine.

A Strong Campaign of Business Men Against Labor Union Exemptions

WASHINGTON, D. C., June 17, 1914.—A well organized campaign against the extraordinary provisions of the Clayton omnibus anti-trust bill exempting labor unions from the operations of the anti-trust laws has been begun by the Chamber of Commerce of the United States and cooperation is confidently expected from other associations of business men throughout the country. In the past week the Chamber of Commerce has issued a statement to its members calling their attention to the pro-labor provisions of sections 7 and 18 of the Clayton bill, which have been fully described in *The Iron Age*, and expressing the opinion that the passage of such a measure would have a most disastrous effect upon business in all lines. Members are requested to take the matter up promptly in communications to their respective Senators and to the individual members of the Senate Judiciary Committee, to which body the Clayton bill has been referred.

The Chamber of Commerce has had considerable experience in fighting this type of class legislation. The sundry civil appropriation bill, as passed by Congress a year ago, contained a provision prohibiting the use of any part of the funds carried by the bill for the enforcement of the anti-trust laws in prosecution of labor or agricultural organizations. The Chamber of Commerce promptly took the lead in the effort to induce the President to veto the bill and while this movement was not a success the President, after signing the measure, issued a statement in which he said that his approval of the bill would have been withheld had it not been made plain to him by the Department of Justice that other funds than those carried by the sundry civil appropriation bill were available for the prosecution of unlawful combinations of workingmen or other persons. The pending sundry civil appropriation bill has been found to contain the same provision as last year with regard to the prosecution of labor and agricultural organizations. It is expected to unite business interests of the whole country in a movement against this vicious legislation in the hope of preventing its enactment in any form.

The Senate Judiciary Committee has already manifested its disapproval of the principal features of the Clayton bill. The decision rendered by the United States Supreme Court on June 8 in the International Harvester case, in which the court appears to take the view that a discrimination under anti-trust laws in favor of labor organizations is not unconstitutional does not meet the objections raised by members of the committee to section7. These Senators assert that even though constitutional such a discrimination is inherently vicious. They are also strongly opposed to that provision of section 18 of the bill which prohibits the granting of injunctions against certain practices of organized labor in conducting strikes and in which picketing, boycotting, etc., are specifically legalized.

W. L. C.

The Steinle Turret Machine Company, Madison, Wis., recently made new arrangements for the sale of its turret lathes. Hill, Clarke & Co., 156 Oliver street, Boston, were appointed agents in the New England States and the Laughlin-Barney Machinery Company, Union Bank Building, Pittsburgh, agent in Western Pennsylvania.

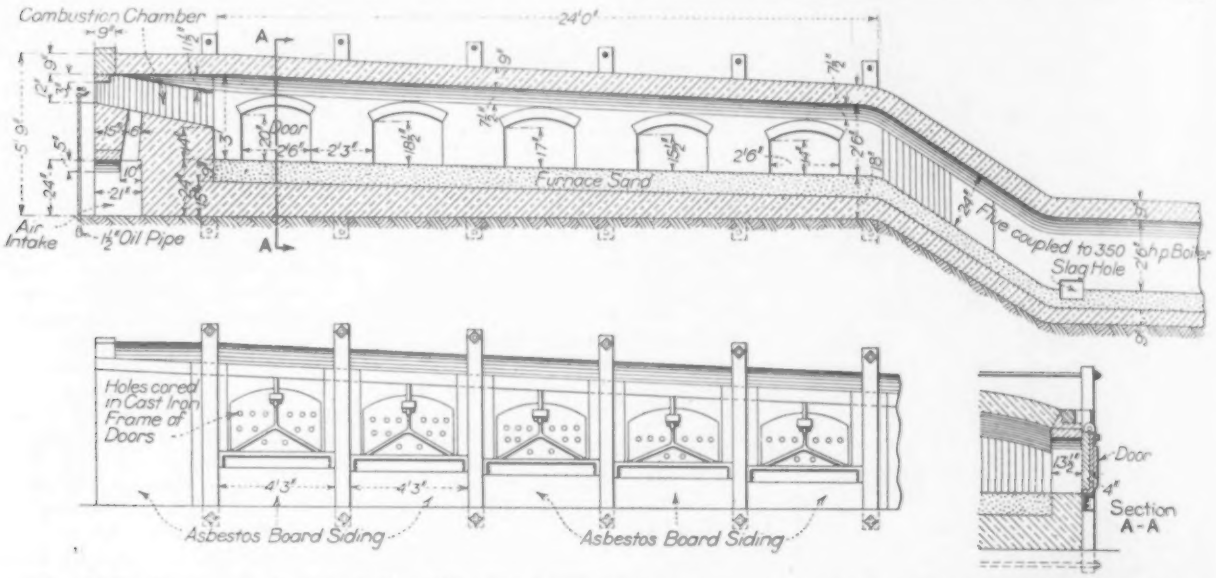
S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

WELDING WITH LIQUID FUEL*

Design of Furnaces Employing This Type of Fuel for a Variety of Material

BY W. N. BEST

The oil burner should be able to thoroughly atomize any gravity of liquid fuel procurable in the open market, such as crude oil, fuel oil or tar. It is now well known that very heavy low gravity crude oil must be used, for this is the cheapest fuel, because it contains so little gasoline or other volatile matter that it does not pay to refine it. This oil at present is procured largely from Mexico, where the supply appears to be practically unlimited, but when the Panama Canal is completed, a great deal of heavy California crude oil of from 14 to 16 gravity Baumé will be delivered to the manufacturing interests along the Atlantic coast. While it is necessary to heat heavy oil to reduce its viscosity, this is a very simple matter.



An 8 x 24-Ft. Furnace, as Used in Rolling Mills and Large Blacksmith Shops for Heating Scrap Preparatory to Welding, Fitted for Oil Firing

The burner should be of such construction that it will not carbonize, and it should distribute a volume of flame and heat evenly throughout the entire charging space of the furnace without the use of brick or spatter walls. One of the secrets of success lies in having the furnace construction in every detail adapted to the work. In other words, to heat 8 or 9 in. of metal when a 3-in. heat is ample is very poor shop practice, for it means a loss of both time and fuel. Other vital points which must be considered are: the furnace construction should be such that the heat is evenly distributed and under the control of the operator at all times; the temperature of the metal should be uniform throughout the length and width of the sections to be welded; furthermore, the nature of the metal should not be changed while being welded, and the oxidization of the metal should be reduced to the minimum.

In welding safe ends on locomotive boiler flues, the usual practice when using soft coal as fuel, is to have one blacksmith and two helpers, it being the duty of one helper to bring the flue from the pile to the smith who heats it and of the second helper to rush it to the flue welding machine where it is welded. The average time required for thus safe-ending flues is 16 flues per hr., for the fire must be coked before a weld can be made, which means not only a loss of time, but also an irreparable loss in fuel for it requires both time and heat to liberate the gases from the coal. Modern practice is now to use an oil fired furnace of special design, which insures a very short heat, approximately only 2½ in. long, and the heating of three flues at once. This furnace has a combustion chamber in which the atomized fuel unites with the air necessary for perfect combustion, which prevents oxidization of the metal while being heated, and as no sand or borax is required, 60 flues are welded per hr. with exactly the same number of men as are used while welding 16 flues with a coal fire. The average welding machine is fully adequate to keep pace with such an oil fired furnace. Imperfect welds with this scientific method of operation are so few that it does not pay to give a water test to each flue, but when using coal as fuel this must always be done, for often the exterior of the weld will look perfect but it will be found to leak badly, because the sulphur in the coal corrodes the metal.

In welding scrap iron, a quantity of scrap is ordinarily piled upon a board, wired thereto and charged into a furnace. After being heated in the usual manner, it is either hammered to size or rolled into billets in a break down mill. The use of oil as fuel for this class of work has the advantages that, first, a more even heat can be attained and maintained in the furnace than with any other fuel; second, the temperature of the heat or charge is uniform throughout; third, if a cobble gets on the roll of the break down mill which it will take some minutes to remove and to readjust the guide, simply by increasing the amount of oil flowing to the burner, the gases in the furnace can be changed from a dioxide to a monoxide which instantly stops the waste of metal, and then after the cobble has been removed, the charge can be made ready to draw in a moment's time by reducing the oil supply which again instantly changes the furnace gases back to carbon dioxide; fourth, a greater output can be obtained from this type of furnace with oil than with any other fuel upon the market because the operator has the fire at all times under perfect control. In the majority of furnaces for this class of work the waste gases are passed, in the same way as when burning coal, through a boiler which is used for the generation of steam.

Flange welding, such as the welding of flanges

*Abstract of a paper presented at a meeting of the American Society of Mechanical Engineers held at Boston, March, 1914.

upon pipe, requires both skill and experience, and while oil is the ideal fuel as the heat can be evenly distributed without turning the pipe, the furnace construction is of vital importance. The furnace should be cylindrical in form, with a combustion chamber and burner so placed that the flame will enter the furnace tangentially, thus causing the flame and heat to encircle the flange and pipe. The vents, through which the consumed and inert gases pass out of the furnace, must be so placed that they will not check the velocity of heat nor prevent the flange and pipe from being heated evenly in their circumference. This same furnace can also be used for "vanstoning" the ends of various sizes of pipe.

For forging purposes, oil is an excellent fuel, especially for large axles or shafts from scrap iron piles. The latter, after being heated, are hammered down into blooms say 5 x 20 in. x 5 ft. and ordinarily three blooms are used to forge an axle. Usually as many piles of blooms are charged into the furnace as there are doors. The piles are heated much more quickly with oil than with coal. It is a well-known fact that car or locomotive axles must be free from any defects such as seams or other flaws caused by imperfect welds, and as the use of oil as fuel means a 30 per cent. reduction in the number of imperfect axles, it is of great benefit to both the employer and employee for it saves not only time and money but prevents wrecks.

As before stated each class of work requires special oil equipment adapted to the size and kind of metal to be welded. For example, in welding wrought iron or soft steel to say 0.60 per cent. carbon steel, the construction of the furnace must be such that the flame will be delivered to the underside of the charge, thus deflecting the flame or abrasive heat upon the wrought iron rather than upon the carbon steel for the former requires the higher temperature. Of course in this case borax is used in making the weld and there should be a preheating chamber constructed in the furnace so that the iron will be heated to 800 or 1000 deg. F. before the 0.60 carbon steel is laid thereon.

In the roundhouse welding of broken locomotive frames the drivers are dropped in the usual manner, the break scarfed and an insert or "Dutchman" driven therein, after which a temporary furnace is constructed around the frame and a portable furnace then used to bring the frame up to welding heat. The blacksmith's work of welding the insert into the break can then be completed in a very few minutes. The time required for bringing the frame up to the welding temperature is approximately 40 min., and the quantity of oil varies from 2¼ to 2½ gal.

The continuous type of billet heating furnace is often used in wire mills. They are about 10 ft. in width and 70 ft. in length. Usually two rows of billets are charged in the furnace and of course the size of the billets varies according to the size of the wire or iron to be rolled, some being as small as 6 in. sq. by 3 ft. long, while others are 12 in. sq. and 4 ft. long. The billets are charged at one end and when sufficiently heated are dropped by hydraulic rams placed in the charging end of the furnace from the burner end of the furnace on conveyors at the will of the operator. Having a furnace of this type insures the billets being heated gradually at a minimum cost of fuel. Only one burner is used on this furnace and the temperature is readily controlled by the operator.

Germany's Exports for Four Months

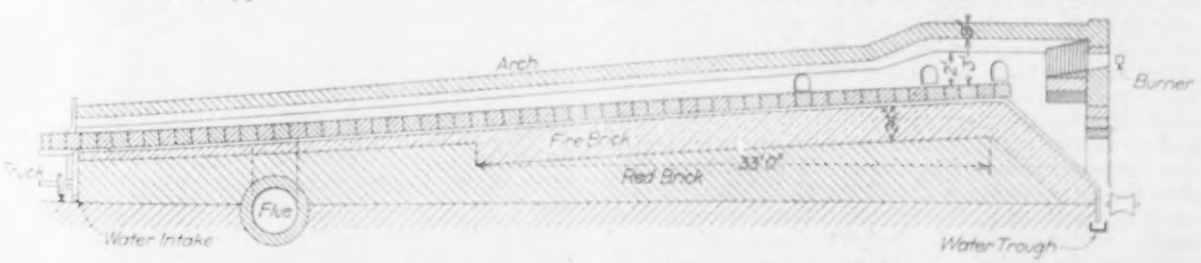
Germany's total exports of iron and steel for the first four months of 1914 were 2,264,057 metric tons, as compared with 2,171,745 tons in the four months ended April 30, 1913. The following table gives comparative figures on leading items exported in April and in the first four months of this and last year in metric tons:

	April		January-April	
	1913	1914	1913	1914
Pig iron	75,249	73,642	322,216	246,797
Scrap	21,418	19,105	75,711	62,991
Semi-finished steel	48,702	75,861	225,298	259,200
Beams	48,913	40,640	162,489	124,332
Other structural shapes	97,667	117,427	357,039	442,449
Heavy plates	41,988	42,252	143,156	164,607
Thin plates	13,753	12,157	50,226	54,813
Wire, rolled or drawn, plain	27,526	25,953	96,202	102,417
Wire, polished	16,453	17,117	60,282	60,674
Wire nails	5,052	5,640	23,200	25,607
Tubing	14,389	12,763	65,381	57,828
Steel rails	52,276	66,828	162,076	184,230
Steel railroad ties	11,699	15,362	42,253	60,533

Prize in Chilean Shop Plan Contest Awarded

The Niles-Bement-Pond Company, 111 Broadway, New York City, has been awarded the first price of $20,000 in a competition for a set of plans for a general railread shop submitted to the Chilean Government. The shop was required to have sufficient capacity to take care of from 500 to 600 locomotives, 500 passenger cars and 6000 freight cars. The plans submitted came from various parts of the world, and those of the winner embodied what is considered the very latest practice of American railroading in all respects. Some 40 sheets of drawings were submitted, showing the ground plan and elevation of every building, a complete plan of the yard, with tracks, yard cranes, paving, etc., plans of a central power house and its equipment and the distribution system. Two complete plans of a machine and erecting shop were submitted, and in this building the tools were arranged in separate groups for each part of the engine. The second prize of $10,000 was awarded to a combination Belgian and English concern. The estimated cost of the shops is $3,000,000.

The Alliance Machine Company, Alliance, Ohio, reports among orders taken the past six weeks a specially designed manipulator for the Heppenstall Forge & Knife Company; one 7½-ton ore bridge, 267 ft. long, for the Pennsylvania Steel Company; 10 cranes, up to 100 tons capacity for the Massillon Rolling Mill Company; 4 cranes for the Bethlehem Steel Company; a bucket crane for the Cambria Steel Company; a soaking pit crane for the Andrews Steel Company; a 10-ton crane of 58 ft. span, for the American Spiral Pipe Works; one 15-ton crane for the Alliance Gas & Power Company; a 9-in. bar mill complete for the Cambria Steel Company; an 850-ton blanking press for the Parish Mfg. Company; a 40-ton crane of 48 ft. span for the N. & G. Taylor Company and one 20-ton crane and six monorail hoists for the Alliance Structural Company.



A Continuous Type of Billet Furnace for Use in Wire Mills Arranged for Oil Fuel

Open-Hearth Furnace Processes Compared

Benjamin Talbot's Review of the Witkowitz Investigation, with Some References to American Practice in Duplexing

At the meeting of the Iron and Steel Institute in London, May 7, Dr. Friedrich Schuster's paper on "The Talbot and Other Open-Hearth Processes," which was printed nearly in full in *The Iron Age* of May 21, elicited considerable discussion. The remarks of Mr. Talbot himself, as reported in the London Iron and Coal Trades Review, are reproduced here together with some of the comments of Otto Frick, inventor of the Frick electric induction furnace:

Discussion by Mr. Talbot

Benjamin Talbot said that much as he was gratified personally that the investigation had been made, and that it had confirmed his own results, he thought the entire metallurgical world owed Dr. Schuster a debt of gratitude for publishing such a useful, extensive and expensive research. Yet he could not help regretting that the paper was not put at his disposal 10 years ago. At that time it might have resulted in great commercial possibilities, but to-day the recompense would be largely the mental and moral satisfaction of his efforts being entirely confirmed, after much criticism by great independent authorities of unquestioned ability.

DR. SCHUSTER'S COMMISSION

Dr. Schuster had started out by sending a commission all over the steel-making world to ascertain and listen to (but not necessarily believe) what was being done and said with regard to the various steel-making processes. To himself Dr. Schuster sent Mr. Hofmann, whose cross-examination was very severe, and he heard of its being no less severe on the other side of the Atlantic. The result of that commission appeared to him to have been that Dr. Schuster did not rely entirely upon any of the reports, because he stated in his paper that everybody had different ideas, so he decided to build a new plant in which the various processes could be satisfactorily compared, so that the results could be conclusive. One had only to look over the plans to ascertain that he had built a magnificent open-hearth shop, containing every modern idea and labor-saving appliance, so that all the furnaces were operating upon the very best up-to-date ideas. He noticed that Dr. Schuster, like a wise general, had made a safe way for retreat from the continuous process, supposing that it did not result in the favorable results anticipated, for it was stated that the furnace was a duplicate of the mixer or, more correctly, the preliminary continuous refining furnace, and could be changed over to do that work. Of course, in a works of the character of Witkowitz, with the varied trades supplied there, several fixed furnaces working special mixtures and alloys would be sure to be useful. However, he would like to call attention to the plans of the furnaces, and especially to the areas given in the regenerators of the various furnaces illustrated. It would be noticed that the regenerators of the 60-ton tilting furnace were as large as those of the 200-ton tilting furnace, which again confirmed what he had previously written and said upon the subject.

Continuing, Mr. Talbot remarked that Dr. Schuster had first sought to be convinced that any grade of steel could be obtained in rapid succession from the continuous bath, of a quality equal to that obtained from the ordinary furnaces; then, after the question of adaptability and quality had been settled, to ascertain what was the cost of making that steel as compared with the others; further, as they proposed to extend their steel works, what was the comparative capital cost per ton of output. After nearly 12 months' work he had proved conclusively that the quality of the steel obtained by the Talbot process was equal to that obtained from the other two systems in every respect—the same in physical and chemical properties; and as steel for weldless tubes had been obtained from the Talbot furnace, Mr. Talbot thought Dr. Schuster had given the steel in question every test that was necessary.

COSTS OF CONSTRUCTION

There was also a comparison of costs of construction, and Dr. Schuster's figures amply confirmed what he had always maintained, namely, that in large modern open-hearth shops, dealing with liquid iron, the Talbot process with the 200-ton tilting furnace would be more economical to build than the 60- to 80-ton tilting or fixed furnace for the same large output.

The table giving all the materials used in making a ton of steel proved that less fuel, oxide, lime, refractory material, and "ferro" were used. It also showed that if less lime, oxide, and refractory material were used with the same metal, there would be a less volume of basic slag, and therefore the phosphoric acid in the slag would be higher and the slag more valuable, and would yield a larger credit to the cost. The question of the quality of slag would, he hoped, now be finally settled, especially for German critics. He had many times had to meet the statement that with Thomas, or basic, pig iron he could not get the same quality of slag as that from the basic converter. He understood that Dr. Schuster had addressed the Verein Deutscher Eisenhüttenleute at Düsseldorf upon the subject and had clearly laid that bogey to rest.

DURABILITY OF BRICKWORK

Coming to the question of upkeep and durability of the brickwork and lining, continued Mr. Talbot, a question which had caused perhaps more discussion than any other, the members might remember that when he read his first paper in 1900, the Carnegie Steel Company sent its metallurgical engineer over to decry his process, and when he read his paper in 1903 the Steel Corporation again sent a representative to give some items of upkeep of the first little 70-ton experimental furnace at Pencoyd, in order to show that it was more expensive to repair than their modern 60-ton fixed furnaces. They thought it was fair to condemn a process from the experimental plant, and to compare it with the design of a fixed furnace that had taken 20 years of practice to evolve, and which was working in another shop under entirely different conditions. The designers of large tilting furnaces had had 10 years' more experience since then, and had improved the design, and so got more economical results.

Dr. Schuster had referred to an important detail, namely, the lining of steel ladles, and was correct in stating that the cost of upkeep of the ladles used in the Talbot process was much less than with those used in the ordinary basic processes. That was due to the absence of slag in the ladles, as was stated. With reference to cost, naturally the author did not give his own figures. He, however, gave comparative figures which were very useful. If the Talbot process cost was given as £100, then under the conditions at Witkowitz, the 60-ton tilting furnace came out at £105, and the fixed open-hearth furnace at £107, an entirely satisfactory result for the Talbot process, and on which he had no criticism to make.

VALUE OF A MIXER

Coming to the question of the so-called mixer, or continuous preliminary refining furnace, that was really

very interesting, as it was found that Dr. Schuster stated that its chief use was for storage and mixing, and that only a minimum amount of refining was done, and yet with that small amount of refining, an increase of 30 per cent. of output was obtained from the steel furnace. But was it a small amount of refining? The analyses of the pig metal poured into the preliminary refiner and of the metal used in the steel furnace were given in the paper. The pig metal was good basic or Thomas metal, and the effect of working in the preliminary furnace was to reduce the silicon about 60 per cent., and the sulphur and manganese about 40 per cent. Fortunately sufficient work was done upon the silicon and sulphur without appreciably touching the phosphorus, as it would have been a loss to have taken out part of the phosphorus and so reduced its percentage in the steel furnace and in the resulting slag, as the basic slag was so valuable. It appeared to Mr. Talbot as if Dr. Schuster had arrived at the correct idea in cutting down the refining in the preliminary furnace. If more work was desired in the preliminary furnace, then that should be made larger if the same output was required.

DUPLEXING IN THE UNITED STATES

Dr. Schuster had referred to the introduction of Bessemer converters as preliminary refiners for open-hearth furnaces in the United States, and had pointed out that at Witkowitz they used that method for many years, and abandoned it in their new plant because of the increased cost in making steel. At two works in America where the Talbot process was used, the Bessemer converter fed the steel furnaces, and enormous outputs were obtained, as much as 5000 tons per week from one 200-ton Talbot furnace. Mr. Talbot thought, however, that the main advantage of that method of work was to increase greatly the output during a boom period, when the profit per ton obtained was larger than any possible increase of cost due to the use of the Bessemer converter. It would be interesting to learn whether in a period of depression, when they were not pressed for steel, the furnaces were supplied with mixed metal instead of Bessemerized metal. [The former, as has already been indicated in *The Iron Age*.—EDITOR.]

The tables given by Dr. Schuster at the end of the paper were very instructive. He appeared to have studied every point, and he was not surprised that the author found the yields almost the same in all the furnaces when working under similar conditions. In conclusion, Mr. Talbot remarked that he did not think anyone using small tilting furnaces would drain them dry after each heat, which was obviously a foolish thing to do, as it took time and put an unnecessary strain upon the furnace lining, and again, even a small amount of metal with a covering of slag was useful if retained in the furnace to help along the next heat. He thought Dr. Schuster had tabulated his conclusions in excellent form, and he entirely agreed with them.

Discussion by Otto Frick

Otto Frick said it was rare indeed to find so many practical data collected together and openly given to competitors, and for the benefit of the steel industry generally. On looking through the tables one could not but agree with the author's conclusions as far as the conditions were concerned under which he had been working, but to quite understand the value of any process and to compare it with others it was necessary first of all to ascertain why one process was better than others, and he did not think the author had told them that.

FURNACES NOT REALLY SIMILAR

He did not at first see why the Talbot furnace should be better and more economical than the others. It would always be found in comparing two furnaces that, though they might seem similar, it was necessary to be very careful to be sure that they were really similar. He did not think that in the present case that condition of affairs existed. The Talbot furnace had a surface of 53 sq. m., while the other furnaces had a surface of 36 and 33 sq. m. In open-hearth furnaces an endeavor was made to transfer the heat from the gases to the bath, and evidently the shallower the bath the more heat was gotten into it. Thus in that respect the Talbot furnace was in a better position than the others.

It would also be found that the furnaces were working under different conditions in so far that the Talbot furnace was working with less scrap, which meant that there was less useful work needed per ton of steel in that furnace than in the others. There again the Talbot furnace had an advantage. With regard to scale and ore, the addition was practically the same per ton of pig added.

It was very astonishing at first sight to find that, notwithstanding the other furnaces had less pig, the same amount of ore and scale added, and somewhat about the same amount of lime added, still the amount of slag produced was very much higher. The extra slag probably came from the roof. The conditions were still more to the disadvantage of the other furnaces if the amount of slag per square meter of surface was taken into consideration. It would be found that the thickness of slag in the other furnaces was increased 180 per cent. in the case of the Wellman and about 60 per cent. in the case of the stationary furnace. That meant that the heat had very much more difficulty in getting through to the steel.

COMPARATIVE COAL CONSUMPTION

The most important point of all, perhaps, was the coal consumption. This was somewhat higher, from about 10 to 20 per cent. That meant that the other furnaces were so designed that they could not utilize more than 46 tons of coal per day. He thought to obtain a proper comparison the author ought to have put down a furnace utilizing as many tons of coal in 24 hr. as the Talbot furnace. While the furnace used a smaller amount of coal, the surface of bath per ton of coal was practically the same. A ton of coal per square meter of bath was somewhat smaller in the Talbot furnace than in the others.

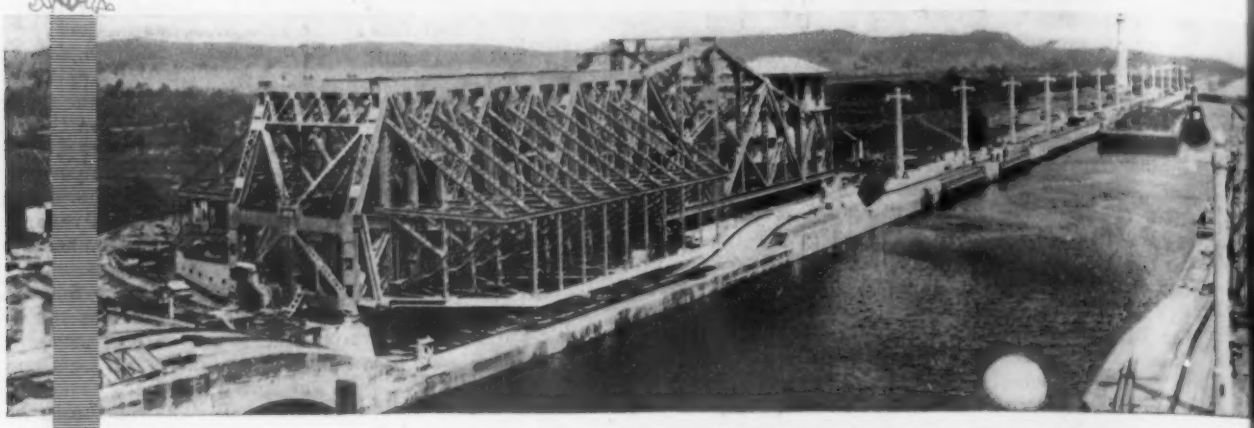
All the points which were of importance in connection with the action of the furnace, or for the transfer of the heat of the gas to the bath, were an advantage to the Talbot furnace, first, the smaller depth of the steel; second, the smaller depth of the slag, and finally, the surface of the bath per ton of coal. He had tried to calculate with the bigger furnace how long the gas stayed above the bath, and he found, on the assumption that there were 36 cu. m. of gas per kg in the coal at 1700 deg. C., that the gas in the Talbot furnace stayed above the bath 4.4 sec., and in the other furnaces 3.5 sec., or 25 per cent. less. It would be thus seen that in connection with all the points he had mentioned the conditions were in favor of the Talbot furnace for the reasons he had given.

COMPARATIVE COSTS

Coming to the question of costs, the author did not give the cost at Witkowitz, but he had given a table showing the cost under similar conditions in the Luxemburg district in Germany. He arrived at the conclusion that the steel cost about 15s. per ton in the Talbot furnace and about 19s. in the Wellman furnace, a difference of 4s. That difference arose in the first place in the cost of raw material. The Talbot furnace had less scrap, the scrap being at the price of 56s. and the pig at only 44s. In those furnaces where there was more scrap a higher price per ton was obtained, but if they were worked under the same processes as the Talbot the cost of material would be the same. There was no reason why they should not be worked in that way.

The next biggest item was the value of the slag, which was about 1s. 8d. more per ton of steel in the Talbot furnace than in the others. As to why the Talbot slag was more valuable and why it was possible to make it more valuable, that depended on the shorter time during which it stayed in the furnace, during which it got silica out of the roof.

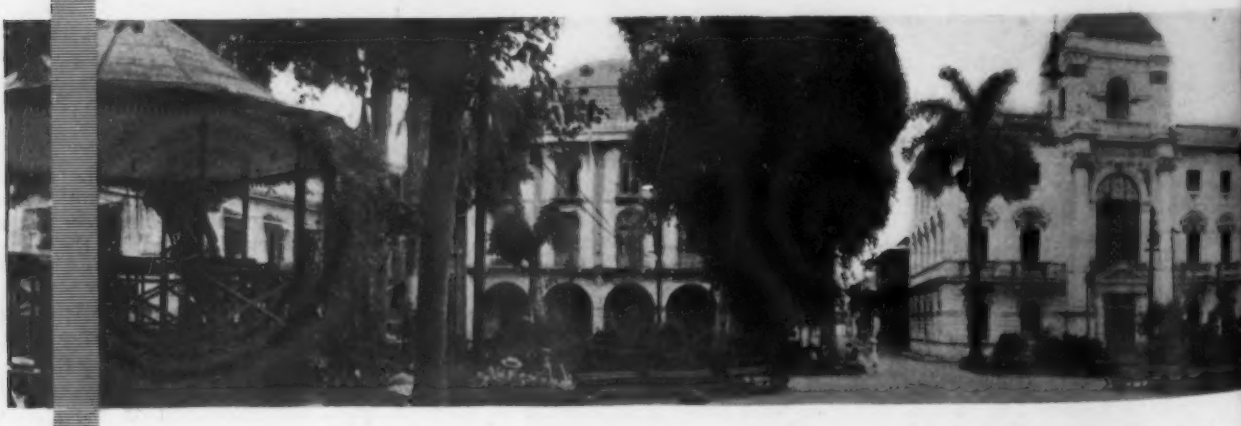
The Panama Canal Now Practi



GATUN LOCKS, SHOWING RACKS FOR TOWING LOCOMOTIVES,

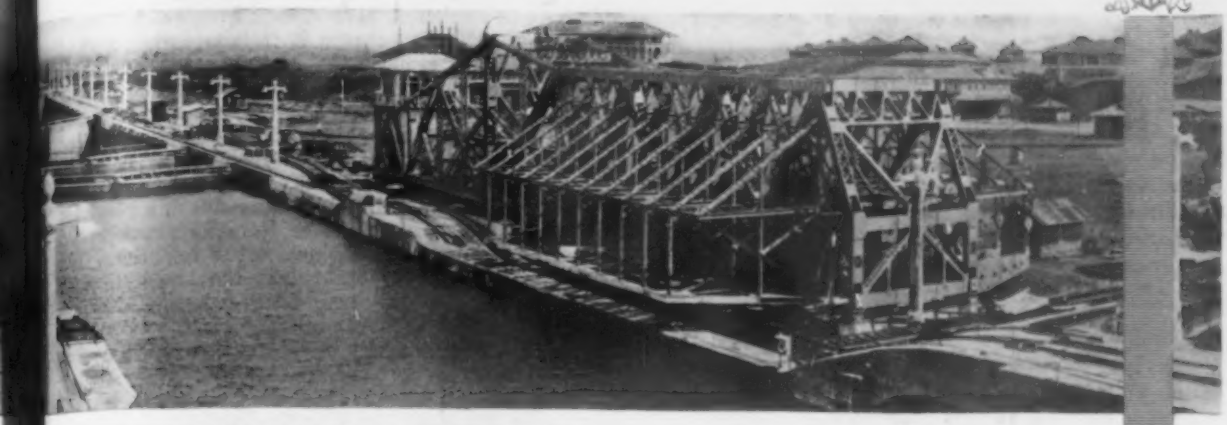
DYING JUNGLE OF GATUN LAKE—AN EXAMPLE OF THE

THE CUCARACHA SLIDE AND GOLD HILL IN THE



PLAZA INDEPENDENCIA, PANAMA CITY; CATHEDRAL AT

lly Ready for Regular Traffic



MP POSTS, BUT ESPECIALLY THE EMERGENCY DAMS

ORT TO MAINTAIN SANITARY CONDITIONS

EBRA CUT, SHOWING DREDGES AT WORK

T, CITY HALL IN CENTER, BAND STAND AT LEFT

DRY CLEANING OF FURNACE GAS

Some Comparisons with Wet Cleaning—Is Excessive Cleanness Desirable?

The paper by Fritz Muller before the London meeting of the Iron and Steel Institute, May 7 and 8, on "The Development of Dry Cleaning in Blast-Furnace Gas Purification," an abstract of which was published in *The Iron Age*, May 14, 1914, was quite thoroughly discussed. Some of the points brought out are given here as reported by the London Iron and Coal Trades Review:

DRY CLEANING PREFERRED

Greville Jones, in opening the discussion, said that after very careful consideration with regard to the question of cleaning gas, his firm decided to install a small experimental plant according to the system described by Mr. Muller. It was put up for the use of blast-furnace gas in the steel works, so that the plant only handled 10,000 cu. m. of gas per hour. The gas traveled to the steel works by a tube about 3 ft. in diameter for about 476 yd., and as it left the blast-furnace end, after passing through dust catchers, it contained about 5.6 grams of impalpable powder. About a gram was lost along that tube, so that, practically speaking, the gas entering the cleaning point contained about 4.5 g. The maximum found was 5.29 g. After passing through the bags the dust in the gas did not exceed 0.035 g. His firm were using rather more power than the author stated in the paper, but that might be due to a lower pressure of gas compared with other works where the dry cleaning was in use. The cost of cleaning was slightly under 2d. per 10,000 cu. m.

His firm was at present trying the use of the clean gas under a boiler. The boiler being used was a Lancashire boiler 30 ft. by 8 ft., with two flues 38 in. in diameter and a heating surface of 1020 sq. ft. There were no cross tubes. The test was carried out for 490 hr. The temperature of the feed water was 150 deg. F. The draught in the chimney was 1¼, and the chimney gases were 550 deg. F. The gases were very carefully analyzed to see that they contained a proper mixture, but the results obtained were nothing like what they were led to expect. In order to try to improve the result, one Saturday morning when the gas was shut off the steel works, a big pressure was put on, but still the results were no better. He believed, however, that with a proper water-tube boiler better results would be obtained. Were he putting up a big installation and introducing gas engines he would have no hesitation in putting in the dry-cleaning plant rather than the wet.

EXTERIOR CLEANING UNNECESSARY

Walter Dixon, of Glasgow, said that while many had confined their attention to the cleaning of blast-furnace gases, he and others had for some time devoted their attention to another phase of the question—not how to take dust out of the gases but how to prevent dust getting into the gases, on the principle of prevention being better than cure. They had so far been able to modify, without any great expense, certain types of blast furnaces so as to render exterior cleaning of the exit gases unnecessary, except where it was required for use in engines, the gases for which, however, so far as Great Britain was concerned, comprised a comparatively small percentage. Of course, what comes out of the furnace very much depends upon what goes in and the prevailing conditions between, but the system of which he spoke appeared to have the possibilities of a cheap and effective method of rendering gases sufficiently clean to enable boilers, stoves, etc., to be run continuously over long periods, without the necessity of any outside and separately operated cleaning plant.

ECONOMIES FROM DRY CLEANING

John A. Smeeton said that every one would agree that the cleaner the gas the better the flame, and the cleaner the surfaces to be heated the greater the heating efficiency. Many boilers working on uncleaned blast-furnace gas were only giving 40 per cent. efficiency; the same boilers fired with dry-cleaned gas gave 70 per cent. efficiency. The saving here was extremely important, not only because it increased the value of each unit, but it reduced the number of units required for any special purpose, and released those previously required for other purposes. The same might be said of the Cowper stoves, soaking pits, heating and melting furnaces and gas mains, all of which derived considerable benefits from a highly cleaned gas.

Whether it paid to install a gas-cleaning plant for blast furnaces only could not be decided without careful investigation into each individual set of conditions. The maximum saving was obtained by the use of the gas released from the Cowper stoves, owing to their increased surface efficiency. In some cases works could not find use for the whole of this gas, in which case it was not necessary that the gas for which they had no use should be cleaned. There was also a saving in coke at the furnaces, owing to the increased blast temperature at an even pressure, and a very considerable saving in stove, flue and gas-tube cleaning, which cleaning was practically eliminated by dry-clean gas. Also, there should be added the value of filter dust, which was only obtained from a dry-process plant. All these points of economy should be added together and set against the capital cost and each case varied according to the conditions. In any event, it seemed clear that excessive cleanliness was a virtue even with blast-furnace gas (especially when gas engines were used), if such excessive cleanliness could be obtained at a cheaper working cost than the lesser degree of cleanliness obtained by wet-cleaning plants at a greater working cost.

EXCESSIVE CLEANNESS NOT AN ADVANTAGE

E. Hall Brown felt that the comparison which had been instituted in the paper between the dry-cleaning system of Halberg-Beth and the wet-cleaning systems, notably that of Theisen, were hardly fair to the latter. At the present time, whether blast-furnace gas was cleaned by the dry or the wet process, it was necessary that the crude gas should be cooled from the temperature at which it left the furnace to a temperature suitable for the cleaning plant. Further, if the finished gas was to have the same moisture content in each case it must be cooled to the same temperature in each case, the maximum amount of moisture in the finished gas being determined by the lowest temperature to which it had been cooled. Whether, then, the gas was to be cleaned by one method or the other, the same amount of heat had to be abstracted from it if the finished product was to have the same amount of moisture in each case. It was open to either system of cleaning to cool by atmospheric cooling or by water injection; but it must be noted that if water injection was used it would have the effect of producing wet sludge from the dust separated in the coolers, whether the system was called a dry-cleaning system or not.

One system had no advantage over the other. Turning to the question of the degree of cleanness attained by the two systems, he had to admit that on the evidence of Professor Mayer the dry-cleaning system produced cleaner gas than any system of wet cleaning with which he was acquainted. What did that amount to? With a Theisen washer or disintegrator the dust content of blast-furnace gas could easily be reduced to 0.015 grams per cu. m., which, he was credibly informed, was considerably less than the dust content of the atmospheric air of most iron works. It was at all events said to be better than the air of Middlesbrough. Was there any purpose in making the gas purer than the air with which it was burned? He could point to six and nine months continuous non-stop runs with gas engines using gas cleaned by Theisen washers, which showed very little accumulation of any kind within valve chests or cylinders. He could not conceive that purer gas was necessary. Certainly if it could be obtained with the same certainty and cheapness as gas cleaned by the Theisen process, there would be no objection to the extra cleanness, but that was all that could be said regarding it.

A PLAN TO CLEAN HOT GASES

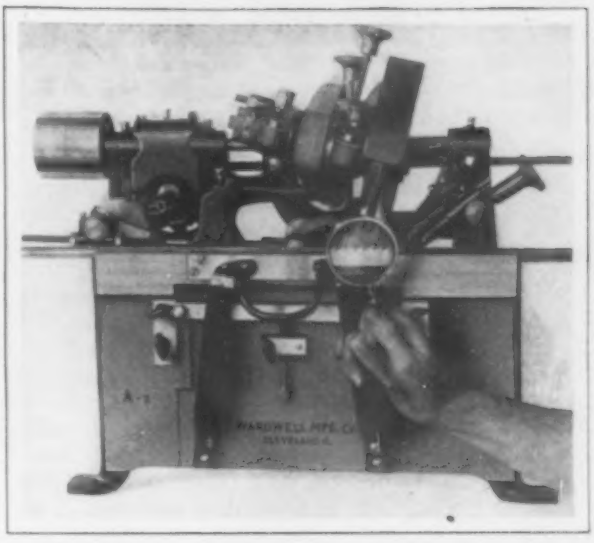
In conclusion, Mr. Brown said that while he was fairly satisfied with the results at present obtained in the purification of blast-furnace gas for use in gas engines, he was satisfied that none of the present systems of gas purification exactly met the case of gas cleaning for boilers and stoves. The degree of purity attained was, of course, quite satisfactory, but no one could justify the enormous waste of heat entailed by the cooling of the gas as a necessary preliminary to its purification. He was satisfied that sufficiently pure gas could be produced for those purposes without the sacrifice of the sensible heat which the gas contained when it left the furnace. It was with the object of saving that heat that they were at present experimenting, and there was more than an indication that in the very near future they would be able to put on the market a gas-purifying plant which would purify hot gas and enable all the sensible heat to be utilized in useful work, instead of dissipating it into the atmosphere or allowing it to escape in drainage water as at present. Until that desirable consummation was attained they believed that the conditions to be fulfilled by gas-cleaning plants could in most cases be met by a wet-cleaning plant, which, among other advantages, had undoubtedly that of less first cost.

Automatic Saw Re-Sharpening Machine

A new automatic saw sharpening machine for re-sharpening hard tempered metal cutting band saws with teeth of various shapes and sizes, has been brought out by the Wardwell Mfg. Company, Cleveland, Ohio. The machine in its movements and adjustments is extremely simple. It is entirely automatic in its operation, and it is pointed out that when started it needs no further attention and the saw passes through with a positive feed at the rate of 50 to 60 teeth per min. The machine gives the teeth a cutting edge instead of a shearing edge so that it is claimed that a re-sharpened saw will cut as clean and as fast as a new saw. The grinding wheel dresses itself.

A main driving shaft extends across the back of the machine and there is a belt drive from this to the grinding wheel driving shaft, which is carried on an oscillating arm supported by hardened steel pivots and swung on a segment. With proper adjustment on the segment the grinding wheel follows the face of the tooth, no matter what the angle of this face may be. The arm is supported on pins that are in contact with a cam, which raises the arm and causes the wheel to rise and follow the back of the tooth after sharpening. An interesting feature of the machine is that it is designed so that only one cam is required to provide the desired movements. From the main shaft through a worm drive a shaft extends on the left side of the machine, on the end of which is an eccentric governing the stroke or feed of the saw that is effected by two pawls shown at the right in the illustration. A secondary adjustment in connection with the feed mechanism permits of a more delicate regulation of the feed. A further adjustment at the right permits the saw being fed so that the grinding wheel will take a light or heavy cut as desired. The cam is slotted so that it can be adjusted for all the various shapes of teeth.

Through the combination of the different movements the raising and the lowering of the grinding wheel is timed so that when the wheel has traveled down the face of the tooth the cam comes into play and raises the wheel as it travels over the back of the tooth. It is stated that the machine is so perfectly controlled, the movement of the grinding wheel is so accurate and the adjustments are so delicate that it can be operated to remove less than



A Machine That Has Recently Been Developed for Re-sharpening a Great Variety of Band Saw Teeth Automatically at Work on a Blade Having 18 Teeth Per In.

0.001 in. of steel from any part of the tooth and that saws having teeth as fine as 20 to the inch can be accurately re-sharpened.

On the front of the machine is a screw adjustment for raising the saw in the vise and permitting a slightly heavier cut to be taken off the teeth without changing any other adjustment. All adjustments have lock nuts so that when tightened they cannot work loose.

The Southern Pig Iron Situation

President J. C. Maben of the Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., is quoted in New York financial columns as looking for the continuance of bad conditions in pig iron through the summer. "Some iron is being sold but is largely the result of backed up orders which consumers now find it necessary to place, having bought comparatively little this year. Numbers of merchant blast furnaces in the north have been blown out and more will follow. This will tend to improve the situation somewhat by restricting production and allowing a depletion of stock. The Sloss company has about 80,000 tons of iron on hand and is selling some good lots at about $10.50 Birmingham. In the fall we will undoubtedly have a rally in all kinds of business no matter what happens. Merchants in Birmingham are beginning to complain bitterly about the state of business and blame Washington more than anything else for the depression. They say that Washington has caused it and Washington will have to relieve the situation."

Prompted by the fact that good roads are of prime importance in the industrial development of a community, the owners of the dam across the Mississippi at Keokuk, Iowa, have built a model highway 25 miles long at a cost of $375,000. It is of easy grade throughout and is designed to carry heavy commercial vehicles. Aside from its economic value, it is a route of great scenic beauty, which will serve indirectly to bring many people there.

Hendricks & Class, manufacturers' agents, will complete twenty years of business existence on July 1. The special lines in which they are interested include heavy hardware, hardware specialties, ship chandlery, railway and dock builders' supplies. The office of this concern is located at 30 Church street, New York City, and it is one of the oldest companies, if not the oldest, in this particular line now in existence.

Three of the six furnaces of the tube department of the Reading Iron Company's plant at Reading, Pa., have been idle since the first week in June because of slack demand and accumulation of finished product.

A 70-TON STEEL CASTING

Housing for a Bloom Shearing Machine, Side Poured Through 12 Headers

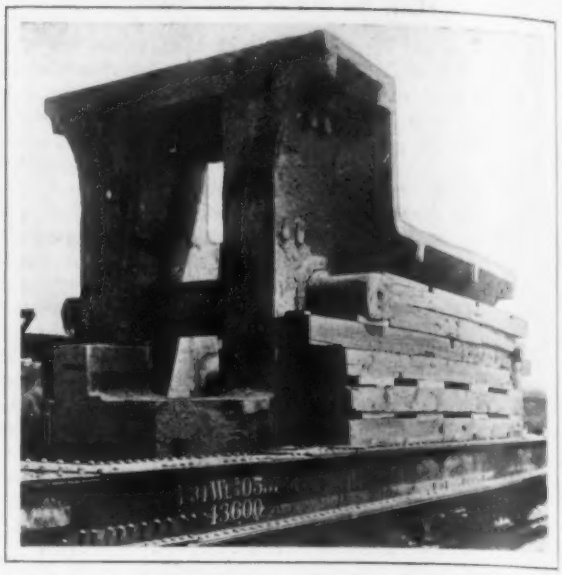
The bloom shearing machine housing, illustrated in the accompanying views, having a net weight of 140,000 lb., was recently cast in the foundry of the Hubbard Steel Foundry Company at East Chicago, Ind. This is perhaps the largest steel casting a Western foundry has thus far attempted to produce. It was made for the Morgan Engineering Company, to be installed in the mill of the Bethlehem Steel Company and a duplicate housing is now being made for delivery to the Minnesota Steel Company at Duluth. In addition to its size this shearing machine offers something new in its design. The shear lever carries the lower knife block, is pivoted at the rear of the housing and driven by crank and eccentric. The bloom is sheared on the upward stroke. The shear has a capacity for cutting 12 x 12-in. blooms.

Patterns for the housing were furnished to the Hubbard Steel Foundry Company and were made requiring the casting to be poured on the side. In building the mold it was possible to go into the floor of the foundry only a few feet. This required building the mold up from the floor and as sectional flasks were used, a very careful reinforcing and locking up of the mold was necessary. The drying also involved careful handling, the expansive cope being lifted off the crane and mounted on props over coke fires while five pots were lowered into the drag. The molding also involved the difficult setting of many cores. The foundry has two acid open-hearth furnaces, one of 25 tons rated capacity and the other 30 tons, a total capacity of 15 tons less than the net weight of the casting. However, the casting was poured from two ladles, the furnaces being crowded sufficiently to yield enough metal. The job was handled with a 35 and a 40 ton crane. The metal was poured through 12 headers, with special care to avoid excessive shrinkage in the thin walls of the spacing web of the housing.

For shipment a well type flat car was required and the over-all hight of the casting crowded the maximum limits allowed by the railroad with a clearance of only 6 in. above the track. The only safe method of blocking the casting on the car involved the casting of two special shafts, the housing being loaded upside down and supported by these shafts fitted into the bearings of the shear lever.

The housing has an over-all length of 18 ft. 5 in., a hight of 12 ft. 7 in. and a width of 9 ft., with a distance of 12 ft. 10 in. from center to center of bearings.

A 70-Ton Steel Casting Which Is to be Used as a Housing for a Bloom Shearing Machine



The Housing Mounted on a Car for Shipment and Carried on Special Shafts Fitted to the Bearings

British Iron and Steel Exports

The iron and steel exports of Great Britain for the first four months of 1914 show a decrease both in tonnage and values from 1913. The total sent abroad to May 1, 1914, excluding iron ore and scrap, was 1,591,769 gross tons against 1,637,503 tons in the first four months of 1913, the decrease being 45,734 tons. The decrease in values was £255,051 or from £13,321,611 to £13,066,560. In pig iron, including ferroalloys, the decrease in exports was 29,576 tons, the total to May 1, 1914, being 357,350 gross tons against 327,774 tons. The exports of galvanized sheets were 27,650 tons greater to May 1, 1914, than for the first four months of 1913, or 277,482 tons against 249,832 tons.

Imports of iron and steel, excluding iron ore and scrap, to May 1, 1914, were 800,547 gross tons against 766,520 tons to May 1, 1913, a decrease of 34,027 tons. The values for these two periods were £5,168,394 and £5,236,759 respectively, a decrease in imports of £68,365 as compared with last year.

The Terry Steam Turbine Company, Hartford, Conn., has just finished one of the largest months in its history in point of orders received, despite the quiet conditions reported by many manufacturers. In order to properly care for the orders booked and possible future business the company has increased the capacity of its plant about 25 per cent. by the installation of additional machine tools.

The Paul J. Kalman Company, St. Paul, Minn., has been awarded the contract for about 2000 tons of reinforcing steel for the new Railroad Building to be erected in St. Paul. Grant Smith & Co. are general contractors. The Paul J. Kalman Company will furnish the reinforcement, including plans.

Rapid progress is being made on the plant of the Canadian Vickers, Ltd., Montreal. The shipbuilding shop and power house have been completed.

TITANIFEROUS IRON ORES

A German Review of Results at American Blast Furnaces

The April 16 issue of Stahl und Eisen has a short article by Prof. Oskar Simmersbach of Breslau on results recently obtained in the smelting of titaniferous ores. It is mainly concerned with what has been done at American plants, giving data not generally known and of decided interest in view of the McIntyre Iron Company's experiments at Port Henry, N. Y., with Adirondack ores. Instead of using a burden composed of titaniferous ore alone, such ore was only used up to such a percentage as did not result in furnace troubles.

At the Bethlehem Steel Company experiments were carried on for two months with an ore containing 19.70 per cent. TiO_2 in a 70-ft. blast furnace. The ores used are shown in Table 1.

Table 1.—Ore Analyses

	Titaniferous ore, per cent.	Cuban ore, per cent.	Magnetite, per cent.
Fe	....	55.99	48.91
Fe_2O_3	70.81	....	....
TiO_2	19.70	....	....
SiO_2	3.17	12.66	8.52
Al_2O_3	3.74	2.31	4.00
CaO	trace	4.94	3.00
MgO	2.92	1.21	2.21
MnO	0.19	....	....
Mn	....	0.17	3.82
P_2O_5	0.09	....	....
P	....	0.03	6.06
SO_3	0.23	....	....
S	....	0.38	0.03
Cu	....	0.06	....

The charge used first contained:

Titaniferous ore	One-twelfth
Cuban ore	Ten-twelfths
Manganiferous magnetite	One-twelfth

Table 2 shows the titanium in both iron and slag after one week's operation.

Table 2.—Titanium in Iron and Slag After One Week

Day	Titanium in pig iron	Titanic acid in slag, per cent.	Analysis of pig iron: Mn., per cent.	S., per cent.	P., per cent.	Si., per cent.
May 29...	Traces	1.62	0.97	0.050	0.100	1.25
May 30...	Traces	1.84	0.83	0.050	0.097	0.75
May 31...	Traces	1.95	0.94	0.045	0.098	1.86
June 1...	Traces	1.47	0.94	0.047	0.096	1.70
June 2...	Traces	1.80	0.96	0.043	0.085	2.09
June 3...	Traces	1.91	0.84	0.032	0.088	1.96
Average ..	Traces	1.76	0.88	0.044	0.094	1.43

Beginning June 3 the burden was changed, the titaniferous ore being raised to 2-12, the Cuban ore lowered to 9-12, the magnetite remaining the same. The analyses of slag and pig iron obtained are shown in Table 3.

Table 3.—Titanium in Iron and Slag After Increasing Charge of Titanium Ore

Day	Titanium in pig iron	Titanic acid in slag, per cent.	Analysis of pig iron: Mn., per cent.	S., per cent.	P., per cent.	Si., per cent.
June 4...	Traces	1.86	0.78	0.07	0.088	1.48
June 5...	Traces	3.06	0.94	0.05	0.089	1.12
June 6...	Traces	2.84	0.45	0.04	0.078	0.47
June 7...	Traces	2.51	0.78	0.045	0.091	1.10
June 8...	Traces	2.00	0.97	0.04	0.065	1.22
June 9...	Traces	1.22	0.96	0.05	0.096	1.19
June 10...	Traces	0.57	0.96	0.039	0.093	1.93
Average ..	Traces	2.01	0.82	0.048	0.086	1.21

The fuel used consisted of ¾ coke and ¼ anthracite, the amount being the same as required for other ores. About 30 per cent. stone was used, containing 81.65 per cent. $CaCO_3$, 13.32 per cent. $MgCO_3$, 2.99 per cent. SiO_2, 1.78 per cent. $Fe_2O_3 + Al_2O_3$, 0.01 per cent. P and 0.04 per cent. S. The slag contained about 45-46 per cent. silica and alumina, 45 per cent. lime and magnesia, 2.5 per cent. sulphide of lime. No furnace troubles were observed, the working being just the same as though no addition of titaniferous ores had been made.

The blast furnace plants in the Lehigh Valley constantly use, with good success, a certain amount of titaniferous magnetite from the Adirondacks in their burdens. An example is given in the article showing the percentages and analyses of the ores used, the special ore constituting 40 per cent. of the charge. The titanic acid in these ores does not usually run over 1 per cent. The charge is so arranged that the titanic acid in the slag does not exceed 2 per cent. A higher amount is avoided, because otherwise the slag becomes difficultly fusible. Also these plants prefer to use limestone instead of the dolomite which is readily and cheaply available. They limit the magnesia contents of the slag to about 6 per cent., at the most 8 per cent. All the titanic acid slags off, giving no trouble, the slags running freely from the furnace. The pig iron is of good quality.

While the results from South Bethlehem and the Lehigh Valley show only traces of titanium in the pig iron, a communication from a former blast furnace superintendent of the Londonderry Works, Nova Scotia, says that formerly magnetites were used containing 5 to 6 per cent. TiO_2, and up to 30 per cent. of the burden. The pig iron showed 2 to 2½ per cent. titanium, the rest of the titanic acid entering the slag. As a flux dolomite and limestone were used in equal amounts, the former containing 20 to 22 per cent. MgO. Due to the lesser degree of fusibility of the slag a higher coke consumption was necessary, and this may be the reason for the high titanium reduction. The iron was used for cast iron pipes. Also in smelting the Mayari ore from Cuba which contains titanium as well as chromium and nickel, it has been noticed that some titanium is reduced into the iron. It varies from 0.05 per cent. to 0.30 per cent. and seems to vary proportionately with the silicon, the low amount being found with 0.22 per cent silicon, and 0.3 per cent. with 1.8 per cent. silicon.

Regarding these results Professor Simmersbach makes the following remarks: As the reduction of titanium into the iron requires fuel and, on the other hand, titanium is not needed in the metal except perhaps for special irons, effort should be directed towards the slagging off of all the titanic acid. So long as the titanic acid in the slag does not exceed 2 per cent. this aim can be reached without developing any furnace troubles, and in particular the slag will remain easily fusible and free running provided its magnesia content does not exceed 6 per cent. With a higher amount of titanic acid than 2 to 3 per cent. the slag becomes difficultly fusible, and deposits and growths form in the furnace rich in titanic acid. In such cases the fusion point of the slag must be lowered and it may be that this end can be reached by adding iron ores containing baryta to the burden, because baryta considerably reduces the melting point of slags.

This was clearly brought out by the results at the Columbus Iron & Steel Company, Ohio, where such an ore was used, and the slag was liquid and ran freely from the furnace although it contained 52.65 per cent. bases to 42.55 per cent. silica and alumina. Fifty per cent. of the burden was composed of an ore containing 59.65 per cent. iron and 3.15 per cent. BaO. The slag showed 29.15 per cent. silica, 13.40 per cent. alumina, 0.40 per cent. ferrous oxide, 45.10 per cent. lime, 5.10 per cent. magnesia, 2.45 per cent. baryta, and 1.85 per cent. sulphur.

A point still remaining to be settled is when the titanic acid plays the part of an acid, and when that of a base, for in this respect it seems to be like alumina. This is important in regard to the melting point of the slags, and would also explain why slags carrying titanic acid sometimes attack the brick work of the furnace, and sometimes do not, often causing serious inconvenience.

Graduated Railroad Transportation Rates*

The Question of Larger Freight Cars, Heavier Loading and a Scale of Rates to Encourage Good Loading

BY J. FRED TOWNSEND†

About thirty-five years ago, the maximum freight carload was 24,000 lb. The New York, Chicago & St. Louis Railroad was constructed at that time; it was built and equipped upon the most advanced ideas, which prompted some one to suggest its popular name, "Nickel Plate," and its new freight cars were all of 40,000 lb. capacity. This car would carry nearly double the load of the cars then generally in use. In the next ten years the 50,000-lb. and 60,000-lb.-capacity cars appeared. Today we have the 100,000 and the 140,000-lb. capacity cars, and it would be hard indeed to convince some people that the limit has not been reached.

However, when such a bulky commodity as coke can be loaded to the highest limit in the modern freight car, i. e., to 10 per cent. above marked capacity in the 100,000-lb. cars, it would seem to a layman that the unit of transportation should be increased, and instead of going through the slow and expensive changes of raising the limit 10,000 or 20,000 lb. at a time, a 200,000 or a 300,000-lb. capacity car should be adopted.

LIMIT OF ECONOMIES THROUGH LARGER CARS

The steel producers have doubled and trebled the size of ships on the lakes and increased the capacity of dock machinery for the more rapid and economical transportation of ore. And it seems to me the railroads' opportunity to increase their net revenue irrespective of increased wages and expenses is here, and that they can accomplish this by following the example of the iron and steel manufacturers in increasing their facilities and then making the best use of them. This can be accomplished by doubling the capacity of freight cars, making the limit 300,000 lb. per car with six-wheel trucks. The gross weight of such cars loaded would not be as much as the new Mallet locomotives that are being very generally adopted.

In the last twenty years, the maximum freight car capacity has increased only 100 per cent., while the locomotive capacity during the same period has increased 400 per cent. The wide difference between the increase in the capacity of the locomotives as compared with the carrying capacity of the freight cars has necessitated the very long freight trains in order to give the heavy locomotives an economical load. This has resulted in an enormous increase in the maintenance of the small freight cars.

The question will naturally be raised as to why the railroads do not adopt a very much more substantial car of 150 tons capacity. The answer can be found in the records of all railroads in this country, which show that in the last ten years over 60 per cent. of the increased capacity of the freight cars has not been used in practice, while the extra cost of hauling the greater dead weight and the extra cost of maintenance has been incurred.

WHY NOT RATES ACCORDING TO THE LOAD

Shippers whose business has been disturbed by periodical increases in minimum weight requirements are disposed to complain because the railroads disregard commercial conditions, which demand the small carload unit; while the railroad traffic managers, pressed on one side by their operating and executive officers to get bigger loads for the bigger cars, and on the other hand meeting shippers' protest against further increase in the minimum weight conditions of the tariffs, are discouraged and almost desperate.

The demand for a small carload unit would not enter into the shipment of such commodities as coal, coke, iron ore, grain, building material and other commodities which are sold and handled in large quantities, under conditions which would make the shipper indifferent as to whether they moved in carloads of 20 or 100 tons, assuming the cost of loading and unloading to be the same. Outside of the limited list of very large jobbers, nearly every buyer wants the smallest quantity on which he can get the minimum delivered price. If the railroads expect such people to buy a large quantity and cooperate in the loading of cars to capacity, their freight tariffs must not only offer indemnity for the greater cost of handling such larger quantities; and to get complete co-operation on the part of shippers, the tariffs should offer some material inducement to trade in large quantities, thereby loading cars to capacity.

The freight tariffs of the European railways are based on the wholesale principle, all rates, generally speaking, being graduated according to the quantity shipped. The American railroads have made what seems to be the mistake of limiting their rates to two base units—the carload, which is anything more than 36,000 lb. or whatever may be the prescribed minimum weight, and the less-than-carload, which is anything under 36,000 lb. and within the limit of the money charge which would be made for the minimum carload shipment.

The average railroad traffic manager is usually obliged to say that any tariff which would fairly meet requirements of small carload shippers, and offer due encouragement to those who would load cars to capacity, would be altogether too complicated. And the same traffic manager is also likely to say that it is difficult, if not impossible, to change rules and practices which have obtained for long periods of time and on which business has been organized and built up. He will further say that the graduation of rates on carload shipments according to weight loaded, could not be made without loss of gross revenue, because the carload rates are now subject to minimum weights, which usually repre-

*From a paper read before the American Iron and Steel Institute, New York, May 22.

†Traffic manager, National Tube Company, Pittsburgh.

sent about 50 per cent. of the average car capacity, and any attempt to increase the rate on small carload shipments would meet the protest of shippers and the veto of state and federal authorities. It would be possible to encourage maximum loading only by offering rates considerably less than the present carload rates. And since the railroads are now able, in one way or another, to get a large proportion of their carload shipments on a capacity loading basis, any attempt to graduate the rates on a consistent basis would certainly result in a loss of revenue.

AN ILLUSTRATION OF INCREASED CAR EFFICIENCY

The United States Steel Corporation was instrumental in creating a car supply during the year 1912, by increasing the average carload from 69,200 to 72,400 lb. In 1912, the average carload was increased 1.6 tons per carload. This increase of only 3200 lb. to the average carload on outbound shipments means that there were 76,105 fewer cars used to handle an equal tonnage as compared with the average carload of 1911. Both the shippers and the railroads were benefited to almost an immeasurable extent in the switching and weighing avoided, namely, the great saving in operating expenses, switching service on 76,105 cars, or 152,210 terminal movements, and the expense of handling this additional number of both empties and loads through the various classification and interchange yards of the railroads, from point of shipment to destination.

The same ten companies last year made a still further increase in the average carload of 1000 lb. per car, effecting a saving on the outbound shipments for the year 1913 of 35,840 cars. To illustrate, one company saved 122 cars by loading only 100 lb. heavier per car during the year. The record of another company emphasizes the importance of heavier loading perhaps more than any other example, for with an increase of only 400 lb. per car on its traffic means that 15,836 fewer cars were required to move the same tonnage.

The average time consumed by a freight car has been estimated by railroad students at 15 days for each trip throughout the country generally. On this basis a freight car should make twenty round trips a year; so that the 76,105 fewer round-trip cars means an actual increase in the car supply of 3805 cars, and is equivalent to the creation of a car shop with a capacity to build that number of cars annually.

Taking the basis of $2.25 as the average gross earnings of a freight car per day, and the movement for the average car as occupying 15 days, the earning power of each car would be $33.75 per trip. The additional equipment that would have been required to handle this traffic, 3805 cars, and this number of cars actually saved, can be estimated in value to the railroads by the earning power, for they were in use in other lines of traffic. Based on the average earning power of $33.75 per car trip, there resulted $2,568,375 increased freight earnings to the railroads without the expenditure of a dollar for additional equipment.

This actual saving may be figured in another way, namely, the value of 3805 cars at about $925 per car, would amount to $3,500,000, which represents an investment that the railroads were not compelled to make.

This is an actual record of what has been done, and shows what really could be accomplished throughout the country. It gives some indication of what enormous sums of money could be saved in operating expenses, which is the right way to increase net earnings without increasing the freight bills to the public, or decreasing the payroll for the employee.

Figure this in any manner that you may, it will prove conclusively the money value of conserving the freight car equipment, not only when there is a car famine, but at all times; and any plan that will increase the average carload will do more for car efficiency than anything else.

Consider what the shippers of the Pittsburgh District generally could accomplish in the way of creating a car supply by increasing the average load per car.

Based on the total Pittsburgh district tonnage for 1912, 164,594,915 tons, an increase in the average carload on approximately the same basis as the record referred to, of, say, 2 tons per car, would have resulted in the same tonnage moving in 409,524 fewer cars.

The shipments of iron ore from the National Tube Company dock at Lorain, where the average carload for 1912 was 96,312 lb. per car, was 107,520 lb. per car, an increase of 11,200 lb per car in 1913. In 1912 this dock occupied the eleventh place in the average carload of the fourteen ore shipping docks on the the south shore of Lake Erie, and in 1913 it occupied first place. If we had followed the 1912 practice of loading, it would have required 6903 more cars to have moved the ore that was forwarded in the 12 months of last year. There was 2,230,981 tons shipped (the largest quantity ever forwarded over the dock), an increase of 18 per cent. in tonnage with an increase in equipment use of only 2 per cent.

A SUGGESTION TO RAILROADS

It seems to me that the traffic officials of the railroads have it in their power to improve the situation in a very simple manner, by issuing graduated commodity rates based on increased carload minimum weights, i. e., commence on the present basis of rates with the present minimum weights and have a table of higher minimums with lower rates. For instance, from Seattle to New York, the table of rates on lumber could be made as follows:

Minimum weight	Rate
20,000 lb.	$1.25 per 100 lb.
30,000 lb.	.85 per 100 lb.
40,000 lb.	.75 per 100 lb.
60,000 lb.	.60 per 100 lb.
80,000 lb.	.50 per 100 lb.

Some people may reach the conclusion that this is a drive to lower freight rates. But if it does lower rates it spells increased net earnings for the railroads, because every buyer in the land would specify the very largest carload in every instance, hence heavy loads. The result would be an actual saving in freight costs to the shippers that would compensate them for building up the heavier loads, and, at the same time, result in a marked increase in net earnings to the railroads.

The production of anthracite again broke the record in 1913, exceeding the highest previous output by nearly 1,000,000 tons, according to figures compiled by E. W. Parker, coal statistician of the United States Geological Survey. The total was 81,718,680 gross tons, valued at $195,181,127, compared with 75,322,855 tons, valued at $177,622,626 for 1912.

The Chicago Foundrymen's Club on the occasion of its last gathering before the summer adjournment arranged an excursion by lake to Michigan City on Saturday, June 20 for its members, families and friends.

Transverse Fissures and Broken Rails

An Investigation by James E. Howard of a Recent Wreck Shows Again That Heavier Loads Are Largely the Cause

A comprehensive investigation of rail, track and wheel load conditions for the purpose of determining the effect upon rails of the recent types of locomotives and cars with their greatly increased wheel loads, is recommended by the Interstate Commerce Commission in its approval of a report just made by the Chief Inspector of Safety Appliances upon the disastrous wreck which occurred last October on the New York, New Haven & Hartford Railroad near Westerly, R. I., due to the derailment of a passenger train which resulted in the injury of 74 passengers and three employees.

SPECIFICATIONS AND FRACTURES

Immediately after this accident the Interstate Commerce Commission, through James E. Howard, engineer-physicist of the commission, undertook a searching investigation in which it secured the cooperation of the Bureau of Standards, the Washington Navy Yard, the New Haven Railroad and the Bethlehem Steel Company. The broken rail which caused the derailment was a C rail, 100-lb. section, open-hearth steel, manufactured in April, 1910, and laid in the track June 5, 1910. The specifications of this rail called for carbon, 0.70 to 0.83; manganese 0.60 to 0.90; silicon, 0.20; sulphur and phosphorus, under 0.04 per cent. The composition reported as having been furnished was: carbon, 0.80; manganese, 0.76; silicon, 0.183; phosphorus, 0.033, and sulphur, 0.046. The rail showed very little wear as the result of its service in the track. It fractured in three places at the time of derailment, at distances of 1 ft. 10 in., 4 ft. 10 in., and 6 ft. 7 in., respectively, from the leaving end. At the first and third of these places transverse fissures were disclosed measuring in diameter about 1½ in. each. Subsequent to the derailment an additional fracture was made when removing the rail from the track, at a place about 5½ ft. west of first line of rupture. At this place a transverse fissure 1¾ in. in diameter was displayed. The rail was then shipped to Providence, where two more transverse fissures were disclosed upon raising one end of the rail and allowing it to fall upon a concrete walk from a hight of about 6 ft. These fissures measured 1¾ in. and ⅜ in. in diameter, respectively. In all, five transverse fissures were displayed in the rail, each of which was located on the gauge side of the head. In résumé these fissures were located at the following distances from the leaving end of the rail; 1 ft. 10 in., 6 ft. 7 in., 12 ft. 1 in., 17 ft. 8 in., and 21 ft.

CHEMICAL AND METALLOGRAPHIC ANALYSIS

The report of the Bureau of Standards, covering a careful chemical analysis and metallographic examination of the rail, was summarized as follows:

1. No unusual segregation of impurities found.
2. The structure throughout the section of the rail is very uniform.
3. The metal immediately adjacent to the "transverse fissures" appears to be of the same nature as throughout the rest of the rail.
4. No unusual segregation of impurities or "slag" can be associated with the transverse fissures; "slag streaks," however, are present here in the usual numbers as are found throughout the rest of the head.
5. The occurrence of the interstitial areas of very coarse pearlite must have an appreciable weakening effect upon the metal as a whole.
6. The occurrence of free cementite, which in itself is a weak, brittle constituent, is a serious defect and may have a direct bearing on the formation of the "transverse fissures" developed in rails of such competition.

Supplementing the work of the Bureau of Standards, Wirt Tassin made a metallographic examination of the rail in which he confirmed the bureau's findings and added the following document:

The general structure of the two rails is such as to warrant the statement that they are of a carbon content that will not afford a toughness and ductility comparable with that of a properly treated rail of a lower carbon content, hence the transverse fissures. To remedy this condition two courses are open—fix the upper carbon limit and prescribe the mill treatment, which will insure the maximum toughness and ductility with sufficient strength, or reduce the wheel loads. The former plan is to be preferred.

TRANSVERSE FISSURES NUMEROUS

The metallographic examinations above referred to and the elaborate series of tests by the railroad company and the Bethlehem Steel Company have been carefully studied in connection with other data recently gathered by the Interstate Commerce Commission concerning rail failures due to transverse fissures. The conclusions of Mr. Howard, embodied in a report to the Commission, are in part as follows:

Concerning the prevalence of transverse fissures in steel rails, of a macroscopic order, not referring at this time to microscopic, of such dimensions as are menacing to the safety of railroad travel, these are believed to be numerous. Forty-six transverse fissures of recent occurrence have been reported in 32 rails. Instances have been reported in which five transverse fissures have been found in the same rail within the limits of 3 feet. They are present in both open-hearth and Bessemer steels. They are not confined to the product of the rail mills of one section of the country. They occur over ties and between ties, near the ends of the rails and along the middle of their lengths, on tangents and in the upper as well as the lower rails on curves. But one general remark can be made—they persistently appear on the gauge side of the head.

In their maximum state of development they have been witnessed in 100-lb. rails having attained a superficial area of 3.3 sq. in., leaving practically only the web and the base intact. The investigation shows without question that these hidden fissures in some rails reach such a state of development before discovery as to destroy nearly the entire head of the rail; therefore it is not reassuring that other rails of similar composition, working under similar conditions of service, are not free from these interior defects.

Data have been gathered illustrating the probable sequence of events which attend the formation of transverse fissures, from the results of which the contributory causes more clearly admit of recognition. Tracing the fissures in the reverse order of their development they are followed down from the larger ones of rails broken in the track having darkened oxidized surfaces to those of an earlier stage of development, of smaller diameter with bright silvery surfaces, which have not yet extended to the outer surface of the rail and therefore retain the brightness of freshly factured surfaces.

Next earlier appear fine cracks, not easily discernible to the eye until the steel has been etched, preceded by other cracks still finer and of a microscopic order, but of measurable length to the eye if the cracks were of sufficient width to be seen. These indications fol-

low each other in such order that they appear to belong together, representing different stages in the loss of structural integrity and destruction of the metal or the rail. They have been looked for, but not found, in steel of similar composition and concurrent manufacture, which has not been in service. As the evidence stands the formation of such fissures seems attributable to track conditions and to those stresses which reach a maximum in the metal of the rail at the head.

ELIMINATING OTHER THAN SERVICE CAUSES

The spontaneous rupture of steels from internal causes occasionally occurs with metal hardened by heating and quenching. Intense internal strains are set up by sudden quenching, which, if not ameliorated by drawing the temper, may occasion spontaneous rupture. Internal strains are left in steel rails as in all hot rolled and naturally cooled steel, modified by shape, weight of section and rate of cooling, and higher strains may exist in hard steels over those of lower grades in composition. These features are all known to exist, and while in a strict sense they are not negligible factors in the use of steels, nevertheless so far as pertains to the formation of transverse fissures in steel rails they are not held to be vital.

In reference to the relative strength of steel at the interior and exterior of the shapes in the different passes of the bloom and rail mills: The metal of the interior has been found lower in tensile strength than that near the surface, in the early passes. However, when the finished rail is reached, these differences are inconspicuous, with the thinner sections of the web and base commonly showing higher strength than the heavier section of the head.

Gagging is an operation common in all rail mills. Necessarily the elastic limit of the metal must be exceeded in this operation, otherwise no permanent straightening would result, and since the elastic limit must be exceeded, it follows that the higher the elastic limit of the steel the greater will be the overstraining force required to effect the straightening.

Significance would attach to these several features in searching for causes leading to the development of transverse fissures if intimate relations were found to exist between them and such defects. While not entirely dissociated, their influence and mutual relations seem remotely connected. Evidence connecting the formation of transverse fissures with these primitive conditions is less direct than that which attaches to track conditions.

Loss in tensile strength, the display of macroscopic and microscopic fissures and the development of transverse fissures, all seem to be associated phenomena, and from the location of the affected metal seem traceable to the action of wheel loads for their development. No other cause is recognized as being present to which their formation could be ascribed.

MR. HOWARD'S CONCLUSIONS

In conclusion it appears:

That the derailment of the train was due to a broken rail.

That the rail fractured under this train by reason of the presence of transverse fissures in its head, one of which was located 6 ft. 7 in. from the leaving end and is believed to have been the place of initial fracture.

That five transverse fissures were found in the rail ranging in diameter from ⅝ in. to 1¾ in.

That fissures of lesser extent were present in both this rail and a companion rail of the same heat, each of which had had the same term of service in the track.

That the metal in the heads of these rails was in a weakened state in certain affected zones, the affected zones being located near the center of the head and toward the gauge side.

That the weakened and structurally impaired metal shown in the tensile tests was confirmed by the metallographic examination.

That the steel in other parts of the rail was structurally sound and possessed of normal strength.

That no slag inclusions were associated with the transverse fissures nor with the microfissures.

That fissures were present in different stages of development, associated with each other apparently as to a common cause, the microscopic examination indicating that such fissures were located in metal otherwise structurally sound.

That miscroscopic fissures were present in certain other used rails which had not yet developed full-sized transverse fissures furnishing evidence that such rails were approaching a state in which full-sized fissures would eventually be formed.

That the proximate causes to which the transverse fissures in broken rail No. 1 are ascribed are high-wheel loads with their attending strains, evidence of other causes not having been found.

That testimony is to the effect that a considerable number of rail failures have recently occurred by reason of the presence of transverse fissures.

That conditions which were precursors to the formation of transverse fissures in broken rail No. 1 exist in other rails now in service.

That the presence in the track and continued use of rails of the same or similar composition to rail No. 1 and exposed to the same service conditions is a source of danger.

That evidence acquired indicates that transverse fissures may be and are formed through the action of high wheel loads upon hard steel rails.

HEAVY TOLL FROM BROKEN RAILS

Referring to this report, H. W. Belnap, chief inspector of safety appliances, adds that they present a serious situation calling for prompt action. Quoting figures covering the past 12 years, he states that the accidents caused by broken rails which have occurred during that period number 2762, resulting in the death of 175 persons and the injury of 6004, and property damage aggregating $3,237,793. This enormous number of casualties refers to a period, the greater part of which elasped before rail failures by transverse fissures were known; but the statistics emphasize the importance which the subject of safety in rails has assumed. In conclusion, Mr. Belnap submits the following recommendation:

"On account of the insidious character of these fissures and the fact that they are progressive in their development, and so far as is known no system of inspection has been found that will detect them until they have reached the surface of the rail, make it extremely difficult to suggest any preventive against future accidents of this character. Although it seems apparent that a remedy lies in the diminishing of wheel pressures and the lowering of direct compressive bending and shearing stresses. From the constant increase in rail breakages occurring from this new type of failure, it would appear that the danger zone in the use of steel rails as at present manufactured has been reached, since the study of the rails here under discussion appears to indicate that transverse fissures are the direct result of high-wheel pressures acting upon hard steel. A complete investigation of rail, track and wheel load conditions for the purpose of determining the effect thereon of the recent types of locomotives and cars, with their greatly increased wheel loads, should be undertaken for the purpose of scientifically determining this matter and ascertaining a remedy."

Nation Wide Boost for Sheet Steel and Tin Plate

About fifty members of the Association of Independent Sheet & Tin Plate Companies, composed of general managers and executive officers of sheet and tin plate companies, attended a monthly meeting, which was held at the Country Club, in Canton, Ohio, June 9. About twenty companies were represented at the dinner and business session. Among the matters discussed was a nation-wide advertising campaign for sheet steel and tin plate products. The Association has been holding its monthly meetings in Pittsburgh, but during the summer will probably hold its sessions at country clubs in other cities.

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.* Charles G. Phillips, *Vice-Pres.* Fritz J. Frank, *Secretary* M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, $5.00 per year; to Canada, $7.50 per year; to other foreign countries, $10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

EDITORS

GEO. W. COPE A. I. FINDLEY W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

Business Men in Politics

Men of business may well wonder at the serious import they long attached to the perennial resolution of chambers of commerce and manufacturers' annual conventions, calling for the taking of the tariff out of politics. Today it would be hard to name any vital concern of business that is not in politics and likely to stay there indefinitely. What is now weighting the minds of business men is not that this or that matter must be taken out of politics, but that they themselves must get into politics alongside of practically every material interest they have.

This will mean, not that manufacturers and others in trade and finance shall now and then unite in making a determined protest against some pending bill or an administrative policy. They have been doing that for years—have been forced to do a great deal of it in times just past—and have been stigmatized as lobbyists because their temporary activity has stood out in such strong contrast with their ordinary policy of keeping hands off and letting all manner of misrepresentation go unanswered.

A change is coming and conditions are forcing its rapid coming. Business men are seeing that they must organize to get an intelligent representation of their interests in Congress. This will not come through denunciation and attack, but by a patient and continuous education of a sadly misinformed public opinion. Speaking on "Business and Politics" before the New York State Bankers' Association last week, President F. A. Vanderlip of the National City Bank of New York made timely use of recent masterly work of the labor unions at Washington to bring home to business men the way in which they must be up and doing. Picturing Congress "working under the watchful eyes of representatives of labor and a House of Representatives unanimously bowing to their demands" he said:

> I would not wish that business organization should go that far to influence legislation, but I would resent the charge that a legitimate presentation of views was lobbying, and I would so organize the business interests that we might, not by an expenditure of money, but by a great expenditure of time, thought, personal work, bring public opinion to a better understanding of the needs of business, to a better understanding that legislation must be along correct economic lines or it will bring disaster to all. I would so organize the business men of the whole country that mere agitators whether in Congress or out of Congress may be held up in their true light to the public. I would openly go into the district of a demagogue and either defeat him or prove that the public of that district wanted to be represented by a known demagogue.
>
> We have stood defenseless in the eyes of the public too long. We have let go unanswered too many untrue charges. We have permitted a picture of business practice and methods to be held up to the voters until many of them honestly believe that success in business is attained by roguery, and unfavorable criticism of a proposed measure by business men is argument enough why such a measure should become a law.

The President of the United States has openly rebuked the efforts of business men to give publicity to their views on pending measures vitally affecting their interests and the prosperity of the whole country. He has even referred to such activity by business interests as though it involved turpitude. He and others need to be brought to a different way of thinking in this matter by seeing business men organized and always at work to secure an informed public opinion. An economic revolution has been under way and vast numbers of the people have been wrongly informed of its causes. What manufacturers have been saying in their conventions as to the need of educating their workmen on the present-day problems of industry applies equally to all the people. Following the example of an Executive who denounced men of wealth, business men for months have been vehemently denouncing the powers at Washington. All the wave of resentment and attack that is now rolling up from industry and trade will come to little. There is a long campaign ahead of education and reasoning together. It must be marked by patience and persuasion, rather than by violence and vituperation.

Foreign Invaders Making Ready

It has been often commented on in the past six months that our imports of iron and steel products, including machinery, under the reduced tariff have been light in proportion to the efforts put forth by foreign producers to get into this market. Some of the reasons for this small success are well known and have been discussed. Among them are the natural preference of American buyers for home products, the convenience of doing business with those from whom they have long been accustomed to buy, the lack of adaptation of many of the foreign products offered to the requirements of the domestic trade, and palpably the diminished ability of consumers in this country in the past year to buy either at home or abroad.

One thing should not be overlooked, however. That is that foreign producers are making use of

this period of slackened activity both in their own market and this to get ready to take orders here when the situation changes. Two large iron and steel producers in Germany have had their representatives on the ground for months, men who have been assigned to an indefinite stay in the United States for the purpose of establishing offices here and opening up relations with manufacturing consumers. In a number of other cases arrangements have been made with various seaboard importing firms who will act as agents for foreign iron and steel manufacturers. In the machinery trade there have been active negotiations with selling firms in this country to represent European makers, particularly those of Germany. Textile machinery manufacturers have already heard from their foreign competitors. Builders of knitting machines, whose labor costs them more than twice the rate paid in Chemnitz, find that the reduction in duty on that class of machines from 45 to 20 per cent. has put them out of competition with Germany. The low state of trade has naturally cut down the demand for knitting machines, either foreign or domestic, but the advantage of the foreign maker under the new conditions will be heard from in no uncertain way when the revival comes.

In some machine tool lines where the disposition some time ago was to make light of the possibility of German competition, the recent activity of German firms in making agency connections in this country is far from reassuring. These German makers have been free to say that they want to establish themselves in this market before the wave of prosperity returns, being confident that they will be rewarded for their patience and their outlay in due time.

An Ohio River-Lake Erie Canal

The quarter-century-old project to build a canal from Lake Erie to the nearest point on the Ohio River has now become so definite that the Governor of Pennsylvania has appointed the commission authorized by the State Legislature to take up the project. The members of the commission draw a total of $21,000 annually in salaries, and have at their disposal an appropriation of $150,000 for a survey. The Legislatures of West Virginia and Ohio have authorized counties contiguous to the canal to bond themselves for proportionate amounts of the $60,000,000 which the canal is estimated to cost.

The first serious efforts to arouse interest in this project were made just 20 years ago, but the suggestion of such a canal was made at least five years earlier. Even this count, however, is not accurate from all viewpoints, since the original proposition was broached something like a century ago. That, however, does not really count, for the sufficient though perhaps curious reason that the canal then proposed was actually built. After a more or less checkered career the last section of that canal fell into disuse about 1870.

There have been three or four surveys for the proposed canal, more complete than might be inferred from the fact that the chief duty of the newly appointed commission of Pennsylvania appears to be to have a survey made. The surveys have indicated that the project is feasible, from an engineering standpoint, or, in other words, that the canal "will work." It would perhaps be more to the point at this time to conduct a commercial and economic survey, to ascertain the probable employment of the canal and to determine how much of the expected traffic will be created by the canal and how much will be withdrawn from existing means of transportation.

There is no doubt that the favor with which the canal project was regarded in the early and middle nineties was due to a feeling that the railroads were charging too high rates, and that there existed no power to bring those rates down. Comparisons of the cost of transporting goods on the canal were made with the existing rail rates, and quite properly, since those rates represented the only condition that could be considered. Today the situation is materially changed, for with existing legislation rates can be made reasonable with respect to the cost of performing the service.

The comparison today, therefore, is to be made between the cost of operating, respectively, a canal and a railroad, given the kind of traffic which the region will naturally afford. The comparison should be made under similar conditions. A comparison between a canal built by the people, who will stand the loss of return on the capital invested for a number of years, and a railroad built by private capital expecting a return upon the investment, beginning at an early date, is not a fair one. So far as we can see, there is no constitutional or legal restriction whereby, if the people of the district desire to increase the transportation facilities, they must do so by building a canal, and are not permitted to build a railroad.

The comparison between canal and railroad suggests interesting possibilities. As we find them in existence, railroads and canals are operated under altogether different conditions. The railroads maintain an important passenger service, operating passenger trains at several times the speed of the freight trains, and among freight trains there are great differences in speed. With a canal the speeds are relatively uniform. There are probably few railroad men, even though not gifted with great imaginative powers, who have not dreamed of what they could accomplish in freight movement if they were given a double track road devoted exclusively to the movement of two processions of freight in opposite directions.

The cost of such a railroad, built to carry freight as a canal carries it, would probably be much smaller than that of a canal of similar carrying power. The report upon which the Lake Erie-Ohio river canal advocates base their views names $60,000,000 as the probable cost, though how accurate this estimate may prove to be we are not prepared to predict. For a four-track road of similar length the cost of rails, track fastenings and ties would be less than $4,000,000, and the total cost apparently would be much less than of the canal. An interesting question is presented as to which would be the more serviceable, a canal as has been proposed, or a purely freight road, four-track, operated on the procession principle such as obtains with a canal. It would seem that the study of this and other questions would throw more light upon the feasibility

or desirability of the project than the geographical survey which seems to be the principal work laid out for the Pennsylvania canal commission, in view of the fact that several surveys have already been made, while these other studies present a virgin field.

A Basic Slag Fertilizer Plant to Be Built at Ensley

The United States Steel Corporation has made an appropriation for the building of a crushing plant near the Ensley, Ala., steel works of the Tennessee Coal, Iron & Railroad Company, equipped for the manufacture of basic slag fertilizer. President Crawford, of the Tennessee company, made the following statement concerning the improvement at Birmingham last week:

"The Tennessee Coal, Iron & Railroad Company will construct in the vicinity of its No. 3 mine at Ensley, a large plant for crushing, pulverizing and sacking basic slag fertilizer of a similar or somewhat better quality than the German basic Bessemer slag fertilizer known as Thomas slag.

"The basic slag fertilizer will contain about 17 per cent. of soluble phosphoric acid. The slag will also contain about 48 per cent. of lime, as compared with 52 per cent. of lime in ground carbonate of lime. Phosphoric acid is a plant food; lime is not. Lime is useful for the purpose of neutralizing acid soils. In this climate, most soils which do not contain carbonate of lime become acid after frequent cultivations, and ground carbonate of lime is recommended as an addition to such soils. The basic slag fertilizer, in addition to carrying 17 per cent. available phosphoric acid, also carries nearly as much lime as carbonate of lime contains.

"The plant will consist of steel and concrete buildings, containing electrically driven crushing, conveying, grinding and sacking machinery. A warehouse will be provided for storing the fertilizer.

"Experiments covering a period of over a year have been conducted at the Ensley plant, and have resulted in producing in the open hearth a slag of better quality for fertilizing purposes than that which is made in the German basic Bessemer plants. The basic Bessemer slag produced in the German mills has been on the market for a number of years, and furnishes the principal supply of phosphoric acid for fertilizing purposes for the German empire, and about 20,000 tons annually has been imported into the United States."

Cast-Iron Segments for East River Tubes

Published reports to the effect that the contracts for the cast-iron segments for the two tunnels under the East River for the Brooklyn Rapid Transit Company have been awarded are without foundation. It is probable that the matter will be decided within the next week and that the work will be apportioned. It is understood that Davies & Thomas, Catasauqua, Pa.; the Wheeling Mold & Foundry Company, Wheeling, W. Va., and the Central Foundry Company, New York, are among the lowest bidders. There is keen competition, and it is stated that the bids are being revised. The weight involved is approximately 74,000 tons.

Harris Brothers, Chicago, who some time ago purchased the entire plant of the Flanders Mfg. Company, Pontiac, Mich., have now made arrangements to dispose of the foundry which will be operated by a new organization capitalized at $150,000. The forge department of the plant is to be operated by Harris Brothers, who advise that it is now being put in shape for operation at as early a date as possible.

The Bridge Builders & Structural Society, at its monthly meeting held in St. Louis, June 11, announces from reports collected by its secretary, George E. Gifford, that in May 57 per cent. of the entire capacity of the bridge and structural shops of the country was contracted for.

The Industrial Railroad Cases

WASHINGTON, D. C., June 17, 1914.—The Interstate Commerce Commission announces that it will of its own accord enter an order in the so-called industrial railroad case and that the order is now being prepared. This is the case in which the commission condemned allowances made by the trunk lines to railroads run in connection with steel plants and strongly intimated that the allowances were rebates. The commission several weeks ago denied a petition for a rehearing of the case. About two weeks ago a petition was filed in the Supreme Court of the District of Columbia for a writ of mandamus to compel the commission to incorporate its findings in the shape of a formal order so the matter could be taken into the courts for review. The decision of the commission in this case was handed down a couple of months ago and did not contain a formal order, hence no review of it could be had by the courts. The decision suggested to the trunk lines that they cancel the allowances in accordance with the opinion expressed, and the trunk lines promptly followed the suggestion, the cancellations taking effect about April 1. These lines are now collecting the full rate and making no division as heretofore with the industrial lines. In announcing that it would enter an order the commission stated this was decided upon on account of the recent decision of the Supreme Court in the tap line case, which decision held the tap lines to be common carriers and the commission concedes there are points of similarity between the industrial lines and the tap lines which afford an opportunity for the matter to be judicially determined. The petition filed in the court here is still pending, but it is understood will not now be pressed. W. L. C.

A Twenty-Five Per Cent. Use of Titaniferous Ores at Port Henry Furnace

The MacIntyre Iron Company's operation of the Northern Iron Company's blast furnace at Port Henry, N. Y., for the thorough testing out of the possibilities in the use of Adirondack iron ores with titanium content began early in this year. For ten days in February a proportion of titaniferous ores was charged, beginning with 1/16 of the total charge and increasing to ⅛. At the time the product was high silicon iron. No deleterious effects were noted in this short run. The furnace worked more regularly, in fact, than in the period immediately preceding. The supply of titaniferous ore was at that time limited and its use had to be suspended. On June 3 its use was resumed to the extent of one-eighth of the charge. The amount was increased on June 10 to 25 per cent. and this percentage has been continued since then. The results obtained on the second run are almost identical with those of the first. The furnace conditions, which at the time titaniferous ore was put on were very unsatisfactory, improved rapidly and have continued to improve to date, we are advised by the company's general manager, F. E. Bachman.

Immigration to the United States promises to make a new record in the fiscal year ending June 30. For the ten months ending with April the total was 1,038,956. Counting the May and June arrivals at the average for recent years would bring the year's total up to 1,350,000. The greatest record thus far was 1,285,349 for 1907.

The Premier Machinery Company, Milwaukee, manufacturer of the Hercules milling machine, but for some time past inoperative, is being reorganized under the direction of Julius Roehr, attorney, First National Bank Building, Milwaukee, Wis.

The Hercules Forge Company, South Senate and Merrill streets, Indianapolis, Ind., has purchased the Bates Forge Company, at receivers' sale. No additional equipment is planned.

An item which appeared in the May 28 issue of *The Iron Age*, referring to the Dixie Portland Cement Company, Sequatchie, Tenn., is in error. The plant of the company is at Richard City, Tenn.

APRIL EXPORTS AND IMPORTS

Iron and Steel Exports 38 Per Cent. Less Than a Year Ago and Imports Up 15 Per Cent.

The April report of the Bureau of Foreign and Domestic Commerce shows that the total value of both the iron and steel exports and imports for April indicate very little change as compared with March. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, in April, was $20,639,569, as compared with $20,551,137 in March and $27,123,044 in April, 1913. Import values for April were $2,893,280, against $2,880,165 in March and $2,849,819 in April, 1913.

The exports of commodities for which quantities are given totaled 161,953 gross tons in April, as compared with 159,999 tons in March and 259,965 tons in April, 1913. All the commodities except wire nails, steel sheets and barbed wire show a decline from the figures of a year ago. The greatest losses in exports are in pig iron, which declined from 21,961 gross tons in April, 1913, to 13,039 tons in April, 1914, and steel rails which are reduced to 27,112 gross tons in April, 1914, from 40,512 tons in April, 1913. A similar falling off is found with the majority of the items given. Wire nails, steel sheets and barbed wire are slightly in excess of the figures for April, 1913.

Details of the exports of tonnage commodities in April and the 10 months ended with April, compared with the corresponding periods of the previous fiscal year, are as follows:

Exports of Iron and Steel

	April		Ten months	
	1914 Gross tons	1913 Gross tons	1914 Gross tons	1913 Gross tons
Pig iron	13,039	21,961	177,375	244,711
Scrap	3,883	8,257	63,273	89,971
Bar iron	324	1,387	1,125	21,139
Wire rods	7,001	7,624	37,350	60,625
Steel bars	9,666	16,681	127,823	196,644
Billets, ingots, and blooms, n.e.s.	5,002	7,441	34,933	214,045
Bolts and nuts	1,616	1,895	17,090	17,076
Hoops and bands	1,172	2,215	9,792	16,025
Horseshoes	110	57	1,055	939
Cut nails	326	469	3,513	4,482
Railroad spikes	725	901	6,797	10,625
Wire nails	3,040	2,623	31,178	46,968
All other nails, including tacks	257	449	2,647	3,604
Pipes and pipe fittings	18,163	30,944	206,405	221,538
Radiators and cast-iron house heating boilers	163	763	4,777	7,236
Steel rails	27,112	40,512	309,793	375,874
Galvanized-iron sheets and plates	5,209	6,605	47,314	102,145
All other iron sheets and plates	664	2,583	9,626	27,713
Steel plates	11,162	24,148	142,826	219,499
Steel sheets	14,389	13,485	117,902	109,707
Structural iron and steel	19,864	45,364	265,677	291,519
Tin and terne plates	5,345	7,521	35,398	62,036
Barbed wire	6,911	6,360	67,714	73,932
All other wire	6,810	9,720	70,365	115,110
Totals	161,953	259,965	1,791,748	2,533,163

The total value of the exports of iron and steel and manufactures thereof, excluding iron ore, for the 10 months ended with April, was $212,818,674, as compared with $252,658,481 for the same period of the previous fiscal year. The value of the imports of iron and steel and manufactures thereof, not including iron ore, for the same period was $26,119,571 as compared with $27,162,886 for the same period of last year.

In April the imports of commodities for which quantities are given totaled 30,594 gross tons, against 24,743 tons in March and 25,742 tons in April, 1913. The principal changes from the previous month were an increase in steel billets without alloys, which were imported to the amount of 26 gross tons in March, 1914, against 1031 tons in April, 1914, and similarly in structural iron and steel from 763 gross tons to 2183 tons. Structural iron and steel increased considerably over April, 1913, when only 519 tons was imported. Steel rails and sheets and plates show a similar increase. There is a marked falling off in tin and terne plates which were imported to the amount of 161 tons in April, 1914, against 2758 tons in March, 1914, and 275 tons in April, 1913. Details of the imports of these commodities in April and the 10 months ended with April, as compared with the corresponding periods of the previous fiscal year, are as follows:

Imports of Iron and Steel

	April		Ten months	
	1914 Gross tons	1913 Gross tons	1914 Gross tons	1913 Gross tons
Pig iron (including ferrosilicon)	.....	14,342	*28,892	127,868
Ferrosilicon	599	.....	†2,648	.....
All other pig iron	15,085	.....	†68,082	.....
Scrap	1,908	3,752	28,659	33,296
Bar iron	1,147	2,646	19,348	24,077
Structural iron and steel	2,183	519	9,352	4,862
Ingots, blooms and steel billets	.....	1,775	*6,317	16,467
Steel billets without alloys	1,031	.....	†3,246	.....
All other steel billets	5,102	.....	†21,852	.....
Steel rails	2,098	725	11,048	3,646
Sheets and plates	549	198	2,391	3,056
Tin and terne plates	161	275	18,973	2,065
Wire rods	731	1,511	10,202	12,945
Totals	30,594	24,743	241,010	228,282

*Figures cover period from July 1 to October 3, 1913, inclusive.

†Figures cover period since October 3, 1913.

The imports of iron ore in April were 111,812 gross tons against 68,549 tons in March, 112,574 tons in February and 174,162 tons in April, 1913.

Pickands, Brown & Co., Chicago, are moving their offices from 72 West Adams street to the 14th floor of the McCormick Building, 332 South Michigan avenue.

CONTENTS

The Case of the Inventor and the Public 1505
Engineering Schools in Industrial Service 1507
Combination Vise and Drilling Machine 1509
Bearings for Rolling Mills 1510
Results of Applied Scientific Management 1512
Russian Meeting of Testing Engineers 1513
Speed Regulator for Induction Motors 1514
Gear Tempering Machine 1514
A Strong Campaign of Business Men Against Labor Union Exemptions 1515
Welding with Liquid Fuel 1516
Germany's Exports for Four Months 1517
Prize in Chilean Shop Plan Contest Awarded 1517
Open-Hearth Furnace Process Compared 1518
The Panama Canal Now Practically Ready for Regular Traffic 1520-1521
Dry Cleaning of Furnace Gas 1522
Automatic Saw Re-Sharpening Machine 1523
The Southern Pig Iron Situation 1523
A 70-Ton Steel Casting 1524
British Iron and Steel Exports 1524
Titaniferous Iron Ores 1525
Graduated Railroad Transportation Rates 1526
Transverse Fissures and Broken Rails 1528
Nation Wide Boost for Sheet Steel and Tin Plate 1529
Business Men in Politics 1530
Foreign Invaders Making Ready 1530
An Ohio River-Lake Erie Canal 1531
A Basic Slag Fertilizer Plant to Be Built at Ensley 1532
Cast-Iron Segments for East River Tubes 1532
The Industrial Railroad Cases 1532
A Twenty-Five Per Cent. Use of Titaniferous Ores at Port Henry Furnace 1532
April Exports and Imports 1533
The Iron and Metal Markets 1534
German Steel Trade Full of Problems 1547
Obituary 1548
Personal 1549
The Supply Men's Annual Convention 1550
Pittsburgh and Nearby Districts 1552
The Westinghouse Strike 1553
Barrows Mine Abandoned 1553
Railroad Men See Machinery 1554
A New Reagent for Etching Steel 1556
Exporting Machine Tools 1557
Hickman, Williams & Co. Changes 1557
The Machinery Markets 1558

The Iron and Metal Markets

LOW PRICES OF THE YEAR

Buying Is Better, but Still Restrained

Pig Iron More Active at Chicago—St. Paul and Canadian Northern Buy Rails

Reports differ on the extent of the improvement in the steel trade noticed two weeks ago. The general condition of restraint in buying continues, but the combination of lower prices and the natural mid-year buying has caused greater activity. It is questioned if the June movement will equal that of January, though it is expected to be enough to make the month's shipments and new business break even.

At Chicago, where the excellent crop outlook is influential, bargain prices are credited with bringing out somewhat larger orders in steel, but it is added that the general check upon business is still operating.

June has brought the lowest prices of the year in practically all finished products, but without willingness on the part of sellers to make them apply many months ahead or effort by buyers, excepting some implement companies and a few others, to contract beyond this year.

Bar buying by implement companies is more noteworthy by contrast with recent months. Some sales have been made at 1.15c., Pittsburgh, for the entire second half, but 1.12½c. has also been done on this delivery, as well as on third quarter alone, and in some cases the 1.10c. price, which has usually applied only to prompt business, has been stretched over the third quarter. Bar iron is particularly weak in the West, and at Chicago has gone to 1.02½c., while 1c. has been reported at Indiana mill.

The St. Paul has released 15,000 to 20,000 tons of rails to a Chicago mill and is believed to have distributed new orders amounting to 20,000 tons. The postponement of the Pennsylvania contract is construed to mean a possible reduction in tonnage, at least in the amount to be rolled under the new specifications, which involve a $4 increase in price or more. The Steel Corporation has taken a contract for 5000 tons of girder rails for New South Wales.

The Canadian outlook for railroad buying has brightened since the government guarantee of bonds of two transcontinental lines. The Canadian Northern has placed 45,000 tons of rails with the Sydney mill. Canadian prospects for car building and for new steel construction work are also better.

The Wabash has practically closed for 60 locomotives. The release of a number of car orders is counted on when the rate decision comes out. The Pittsburgh, Shawmut & Northern has bought 750 coal cars and the Atlantic Coast Line 100 logging cars. The Toledo & Ohio Central is asking bids on 1000 box and 1000 gondola cars.

The state of the structural trade in May is indicated by the Bridge Builders' and Structural Society report showing that 57 per cent. of the capacity of fabricating shops was contracted for in the month, against 88 per cent. in April and 76 per cent. in March.

April imports of iron and steel, just compiled, show more plainly the effect of low duties, the increase over March being 5000 tons, or 20 per cent. In the ten months ending with April rail imports were 11,000 tons, or three times as much as in the corresponding period of the preceding year.

On the Pacific Coast, in particular, imports have depressed domestic prices. Jobbers there have been active competitors of the mills as the volume of business has been shrinking.

Further sales of Southern pipe iron have been made and the total for two weeks is now put above 125,000 tons. Sales of Southern foundry grades are more commonly at $10.25, Birmingham, for No. 2. Southern Ohio iron has sold at $13, Ironton, and at Buffalo, $12.75 for No. 2X was reached in several recent sales. Chicago reports a broader market for foundry iron. At Pittsburgh one inquiry is for 15,000 to 25,000 tons of foundry iron.

In eastern Pennsylvania nearly 5000 tons of low phosphorus pig iron has been sold and considerable inquiries are pending. English hematite has declined lately and offers in the Philadelphia market have led to the shading of $20.50 on the domestic product.

Sales of 80,000 tons of Lake non-Bessemer ore are reported in the Central West in a market that has scarcely moved since prices were named for this year. In the East practically nothing has been done in Newfoundland ores. Some Swedish ore has been offered here from a property supposed to have sold all its output in Europe.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous

	June 17, 1914.	June 10, 1914.	May 20, 1914.	June 18, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia	$14.75	$14.75	$14.75	$16.00
No. 2, Valley furnace	13.00	13.00	13.00	14.00
No. 2 Southern, Cin'ti	*13.50*	13.75	13.75	14.00
No. 2, Birmingham, Ala.	*10.25*	10.50	10.50	10.75
No. 2, furnace, Chicago*	13.50	13.50	14.00	15.50
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.75
Basic, Valley furnace	13.00	13.00	13.00	14.50
Bessemer, Pittsburgh	14.90	14.90	14.90	16.90
Malleable Bess., Ch'go*	13.75	13.75	14.00	15.50
Gray forge, Pittsburgh	13.65	13.65	13.65	14.65
L. S. charcoal, Chicago	15.75	15.75	15.75	16.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh	19.50	19.50	20.00	26.50
O.-h. billets, Pittsburgh	19.50	19.50	20.00	26.50
O.-h. sheet bars, P'gh	20.50	20.50	21.00	27.00
Forging billets, base, P'gh	25.00	25.00	25.00	34.00
O.-h. billets, Phila	22.40	22.40	22.40	28.00
Wire rods, Pittsburgh	24.50	24.50	25.50	29.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	12.75	12.75	12.75	14.00
Iron rails, Philadelphia	15.00	15.00	15.00	17.50
Carwheels, Chicago	11.50	11.50	11.50	13.50
Carwheels, Philadelphia	11.25	11.25	11.75	13.00
Heavy steel scrap, P'gh	11.50	11.50	11.50	12.50
Heavy steel scrap, Phila.	10.50	10.50	10.75	11.50
Heavy steel scrap, Ch'go.	9.75	9.75	9.50	10.75
No. 1 cast, Pittsburgh	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia	12.00	12.00	12.00	13.25
No. 1 cast, Ch'go (net ton)	9.75	9.75	10.00	10.50
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.17	1.17	1.20	1.52½
Iron bars, Pittsburgh	1.25	1.25	1.30	1.65
Iron bars, Chicago	*1.05*	1.10	1.10	1.50
Steel bars, Pittsburgh	*1.10*	1.12½	1.15	1.40
Steel bars, New York	*1.26*	1.28½	1.31	1.56
Tank plates, Pittsburgh	1.10	1.10	1.10	1.45
Tank plates, New York	1.26	1.26	1.26	1.61
Beams, etc., Pittsburgh	*1.10*	1.12½	1.15	1.45
Beams, etc., New York	*1.26*	1.28½	1.31	1.61
Skelp, grooved steel, P'gh	1.15	1.15	1.20	1.45
Skelp, sheared steel, P'gh	1.20	1.20	1.25	1.50
Steel hoops, Pittsburgh	1.25	1.25	1.25	1.60
Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.85	2.25
Galv. sheets, No. 28, P'gh	2.75	2.75	2.80	3.35
Wire nails, Pittsburgh	1.50	1.50	1.55	1.80
Cut nails, Pittsburgh	1.55	1.55	1.60	1.70
Fence wire, base, P'gh	1.30	1.30	1.35	1.60
Barb wire, galv., P'gh	1.90	1.90	1.95	2.20

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville, Per Net Ton at Oven:	1914. June 17,	1914. June 10,	1914. May 20,	1913. June 18,
Furnace coke, prompt	$1.75	$1.75	$1.75	$2.15
Furnace coke, future	1.85	1.85	1.90	2.25
Foundry coke, prompt	2.30	2.30	2.40	2.75
Foundry coke, future	2.50	2.50	2.50	3.00

Metals, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	14.12½	14.12½	14.37½	15.50
Electrolytic copper, N. Y.	13.87½	13.87½	14.12½	14.87½
Spelter, St. Louis	4.95	4.95	5.00	4.95
Spelter, New York	5.10	5.10	5.15	5.10
Lead, St. Louis	3.80	3.80	3.80	4.20
Lead, New York	3.90	3.90	3.90	4.35
Tin, New York	30.65	30.65	33.00	44.75
Antimony, Hallett's, N. Y.	6.87½	6.87½	6.85	8.15
Tin plate, 100-lb. box, P'gh.	$3.30	$3.30	$3.30	$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.10c. to 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.30 to $1.35; galvanized, $1.70 to $1.75. Galvanized barb wire and fence staples to jobbers, $1.90 to $1.95; painted, $1.50 to $1.55. Wire nails to jobbers, $1.50 to $1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.95	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, $24.50 to $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	77	68½	1½	56	45
2½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap	77	68½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends

2	74	65½	1½	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

¼	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.	49
2½ to 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ to 2¾ in.	54
3½ to 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ to 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.30
Nos. 9 to 10	1.35
Nos. 11 and 12	1.40
Nos. 13 and 14	1.45
Nos. 15 and 16	1.55

Box Annealed Sheets, Cold Rolled

Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	2.00 to 2.05
Nos. 17 to 21	2.15 to 2.20
Nos. 22 and 24	2.30 to 2.35
Nos. 25 and 26	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., June 16, 1914.

The middle of June has passed and as yet the expected buying movement in the steel trade has not developed to any great extent, but it is true that there has been a small increase in new orders, these no doubt representing actual needs of jobbers and consumers. Consumers do not seem to be very eager to cover ahead, believing that higher prices are remote. The mills are not anxious to sell ahead very far on the basis of 1.10c. for plates, shapes and bars, and are trying hard to restrict deliveries as much as possible to third quarter. A fair tonnage of steel bars has been sold for last half of the year at 1..10c. and 1.12½c., with reports that in some cases 1.15c. has been obtained. New demand in some lines, notably sheets and pipe, is better, but prices do not show any improvement. There is a good deal of inquiry out for pig iron, but most furnaces are hesitating about selling pig iron over the second half of the year at present low prices. The feeling in the trade is not quite so optimistic as to the immediate future, and the belief is still strong that not until after the fall elections will there be permanent betterment in the steel business. The claim is strongly made that politics is a factor in the situation.

Pig Iron.—There is a fair amount of active inquiry, the largest being from a local sanitary interest which is in the market for 15,000 to 25,000 tons of Northern and Southern foundry iron for last half delivery. Another large consumer is in the market for 4000 to 5000 tons of Northern foundry for last half. Bessemer and basic iron are very dull, the only active inquiry out for basic being that of the American Steel Foundries, which has been on the market for three or four weeks. It is said that offers of less than $13, Valley furnace, for basic iron have been turned down. A consumer in the Wheeling district has bought about 3000 tons of basic iron from a nearby furnace on a basis of about $13.30 at the furnace, which has a freight rate of 27½c. a ton to the point of delivery, the buyer and seller each absorbing part of the differential in freight, if the iron came from the Valley. We quote nominally $14 for Bessemer pig iron; and basic iron $13, no actual sales having been made in this market for some time. Northern No. 2 foundry is held at $13 to $13.50, one local interest having sold about 1000 tons at the higher price in the past week. Gray forge is about $12.75, and malleable Bessemer $13 to $13.25, all at Valley furnace, with a freight rate to Pittsburgh or Cleveland of 90c. a ton.

Billets and Sheet Bars.—Average operations among the steel mills making Bessemer and open-hearth billets and sheet bars in the Pittsburgh and Valley districts are running from 50 to 60 per cent. New inquiries for steel are very light, not enough new business coming out seriously to test prices. We quote Bessemer and open-hearth billets at $19.50 and Bessemer and open-hearth sheet bars at $20.50, f.o.b. makers' mill, Youngstown or Pittsburgh districts. Several consumers state they have bought sheet bars at $20, maker's mill. We quote forging billets at $25 for desirable orders of one size and up to but not including 10 x 10 in., regular extras being charged for larger sizes. On carload orders forging bilets are held at $25. We quote axle billets at $23 for desirable orders and $24 for small lots, f.o.b. Pittsburgh.

Ferroalloys.—The new demand is very light, as consumers are covered for considerable time ahead. English 80 per cent. ferromanganese in resale lots is being offered at $37.50, Baltimore. We note sales of several carloads of ferrosilicon for prompt delivery at the full price of $73, delivered. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $7; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Muck Bar.—We quote best grades of muck bar, made from all pig iron, at nominally $27, Pittsburgh. No sales have been reported in this market for some time.

Structural Material.—New inquiry is still very light. Bids have gone in on 4000 to 5000 tons for the proposed William Penn Hotel, this city, and the Pittsburgh Gazette-Times will erect a new power plant in this city requirng 1000 to 1200 tons. Fabricators say they are figuring on a fair amount of work, but it is very slow in closing on account of the uncertain outlook. On desirable orders for prompt shipment beams and channels have sold at 1.10c., and we quote beams and channels up to 15 in. at 1.10c. to 1.15c., f.o.b. Pittsburgh, prices depending on the desirability of the order and the shipments wanted.

Plates.—Orders for steel cars in the past week have been very light. The Pressed Steel Car Company has taken 20 steel hopper cars for the Lake Champlain & Moriah railroad, and the Standard Steel Car Company 20 steel passenger cars for the Mahoning Valley Electric Street Railway Company. The general demand for plates remains very dull, and the mills are badly in need of work. We quote ¼ in. and heavier plates at 1.10c. to 1.15c., f.o.b. Pittsburgh.

Steel Rails.—The expected order of the Pennsylvania Railroad has not yet been placed, and current business in standard sections is mostly for small lots. The new demand for light rails is only fair, the Carnegie Steel Company having received new orders and specifications in the past week for about 2200 tons. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots these prices might be shaded.

Steel Wheels.—No orders of moment for cast steel wheels have been placed in this district for some time. We quote 33-in. engine truck wheels at $21; 36-in. engine truck wheels, $22; 33-in. tender wheels, $17; 36-in. passenger and tender wheels, $19 to $19.50; 33-in. freight car wheels, $14.50 to $15, f.o.b. Pittsburgh.

Skelp.—New orders are light, and none of the skelp mills is running to more than 50 per cent. of capacity, one leading mill in the Youngstown district being closed this week for lack or orders. Prices are only fairly strong, and we quote: Grooved steel skelp at 1.15c. to 1.20c.; sheared steel skelp, 1.20c. to 1.25c.; grooved iron skelp, 1.50c. to 1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—Consumers whose contracts for rods will expire on July 1 have pretty well covered their needs over third quarter and last half of this year. Makers report that specifications against contracts are not coming very freely. We quote Bessemer, open hearth and chain rods at $24.50 to $25, f.o.b. makers' mill.

Cotton Ties.—No announcement has been made by the Carnegie Steel Company of its prices on cotton ties for this season's delivery, and it may not be made for some time. No estimate has been given of the probable tonnage in cotton ties this year, but it is said a good part of the business may go to foreign mills, which are prepared to make low prices.

Iron and Steel Bars.—There has been a fair amount of buying of steel bars by the implement companies for third quarter and second half delivery. It is said that for third quarter 1.10c. has been named on some of this business, but for delivery over second half 1.12½c. is the reported basis. The mills are refusing

to sell steel bars into 1915, except at an advance of at least $2 per ton. The current demand for merchant steel bars is quiet, and mostly in small lots to cover current needs. Iron bars are dull in demand and prices are weak. The new demand for reinforcing steel bars is active, and the Carnegie Steel Company has taken about 2000 tons for a filter plant on the West Side, Cleveland. We quote steel bars at 1.10c. to 1.15c., the lower price being named only on very desirable contracts, and for delivery not beyond third quarter. We quote common iron bars, in which only a small part is scrap, at 1.25c., f.o.b. makers' mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¾-in. and over, $1; ½ to 11/16-in., $1.50; under ½-in., $2.50 per net ton. These extras are not always observed.

Sheets.—New demand for blue annealed, black and galvanized sheets, and also specifications against contracts is better than for some time. Jobbers and consumers are anxious to cover as far ahead as possible at present prices, but the mills are averse to taking contracts for delivery beyond the third quarter, and some mills will not sell beyond August. It is believed that prices on sheets, if the demand continues to improve, will soon show some betterment. We quote Nos. 9 and 10 blue annealed sheets at 1.35c.; No. 28 Bessemer black, 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; No. 28 black plate, tin mill sizes, H. R. and A., 1.85c.; Nos. 29 and 30, 1.90c. The above prices are in carload lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—Mills report that specifications are still coming in at a good rate, but in the past month or so have not been so active as earlier in the year. However, most of the leading mills are still running practically full capacity, the American Sheet & Tin Plate Company running this week to 93 per cent. The new demand is light and only for small lots, and we quote 100-lb. 14 x 20 coke plates at $3.30 to $3.40, 100-lb. 14 x 20 terne plates at $3.20 to $3.30 f.o.b., Pittsburgh.

Shafting.—Specifications are coming in a little better, but are still far short of being satisfactory. New demand is fair, but mostly in small lots to cover current needs. We quote cold rolled shafting in carload and larger lots at 65 to 66 per cent. off, and in small lots at 63 to 64 per cent. off, delivered in base territory.

Spikes.—The spike trade has been in very unsatisfactory condition for some months, none of the makers running to over 50 per cent. and some at a less rate. New demand is dull and only for small lots to cover current needs. We quote standard sizes of railroad spikes at $1.40, and small railroad and boat spikes at $1.50 per 100 lb. in carload and larger lots, f.o.b. Pittsburgh.

Merchant Steel.—There is a fair demand for seasonable steels, but mills report that specifications on contracts are very slow. Prices are more or less shaded, but not enough new business is coming out to test the market. On small lots we quote: Iron finished tire, ⅛ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wire Products.—Specifications against contracts are slow, and the wire trade will likely be dull over the next two or three months until fall business starts. We quote wire nails, $1.50 to $1.55; plain annealed wire, $1.30 to $1.35; galvanized barb wire and fence staples, $1.90 to $1.95; painted barb wire, $1.50 to $1.55, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.55 to $1.60, f.o.b. Pittsburgh.

Hoops and Bands.—Not enough new business is coming out in either hoops or bands to test prices, and specifications against contracts are very slow. We quote steel bands at 1.10c. to 1.15c., with extras as per the steel bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh. This price on steel hoops would be shaded if any orders of moment were being placed.

Nuts, Bolts and Rivets.—New demand for these products is very dull, and does not represent more than 25 to 35 per cent. of capacity. Boiler and structural rivets are also quiet, but new demand for the latter is reported a little better. We quote buttonhead structural rivets in carloads at 1.55c. and in small lots 1.60c. to 1.65c.; conehead boiler rivets at 1.65c. in carload lots, and 1.70c. to 1.75c. in small lots, with terms 30 days net, less 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blanked and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.p.c. and r sq. nuts, blanked and tapped	$6.00 off list
Hexagon nuts, ⅝ and larger	$7.20 off list
Hexagon nuts, smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$5.90 off list
Semi-fin. hex. nuts, ½ in. and smaller,	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85, & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Boiler Tubes.—Locomotive tubes are reported in little better demand, but merchant tubes are still very quiet. Discounts on charcoal iron tubes are being shaded to the extent of an extra 5, and sometimes two 5's on very desirable orders.

Standard Pipe.—Several leading pipe mills report that new demand for merchant pipe and oil well supplies so far this month has been heavier than in the same period in May. A good deal of line pipe has been placed lately, and several large projects involving heavy tonnages of large pipe are being figured on, and may be placed at an early date. It is said that prices have been made on some recent contracts for line pipe that leave little or no margin of profit. Discounts on iron and steel pipe are being quite well held.

Coke.—Two or three large inquiries for blast furnace coke for last half delivery are in the market, but progress in closing is very slow, as blast furnace owners say the pig iron market does not justify the high prices asked. Output of coke in the two Connellsville regions and elsewhere is at a less rate now than for several years. We quote standard makes of furnace coke for prompt shipment at $1.75, and for delivery over the last half of the year at $1.85 to $2 per net ton at ovens, but the latter price is regarded as prohibitory, and probably will not be obtained. We quote standard makes of 72-hr. foundry coke at $2.30 to $2.50, several makers of foundry coke that have a very high reputation in the trade holding for the latter price. Output of coke in the upper and lower Connellsville regions for the week ending June 5 was 243,609 tons, a decrease from the previous week of 419 tons. The Connellsville coke trade has settled down to about a 50 per cent. operation.

Old Material.—A peculiar condition exists in the local scrap market. Dealers state that while it is hard to make sales or to get any better prices, yet when they do not have the scrap to cover a sale they find trouble in buying it in the open market. There is a scarcity of the leading grades of scrap, largely because the steel mills have been running at only 50 to 60 per cent. of capacity for some time, thus making very little scrap, while their consumption has been not much over half the usual quantity. Borings and turnings are about the only materials moving in the local market, borings bring $8.25 to $8.50, and turnings $7.75 to $8, delivered

to consumers' mills in the Pittsburgh district. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$12.00
Ordinary steel melting scrap	$11.50 to 11.75
Compressed side and end sheet scrap	11.00 to 11.25
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.50 to 8.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to 13.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.25 to 14.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	12.00 to 12.25

†Shipping point.

The office of A. C. Daft, dealer in pig iron, ferroalloys and coke, has been removed from room 2501 to room 445 Frick Building, Pittsburgh.

Chicago

CHICAGO, ILL., June 17, 1914.—(*By Wire.*)

Bargain prices are bringing out a more liberal volume of orders. The release of these specifications is improving the tone of the market and the influence of crop reports has brightened the outlook, but the larger forces of business are still held in check. Conservative buying, such as the present market is experiencing, may sustain life and even produce an occasional reviving flutter, but something more is needed to bring recuperation. The general condition of restraint under which business is laboring does not seem to have changed, but the combination of very attractive prices and the natural midyear buying period is responsible for considerable activity in steel and pig iron. The St. Paul Railroad has bought about 40,000 tons of rails; the car builders are sending in specifications covering the material for cars recently purchased, and the foundry interests are buying for their last half needs. Such contracting as is being done is confined very largely to third quarter. The freedom of contracting is restricted by the uncertain outlook, by the unwillingness of the mills to commit themselves and by the tonnage that is being carried over into the second half on old contracts. For shapes, plates and bars one still hears of 1.33c., Chicago, but the average transaction is on the basis of 1.28c., and attractive business is quotable at 1.25c., Chicago. Sheets and bar iron are correspondingly low. The buying of pig iron has become general and has extended to the general run of foundries, the past week being characterized by the number of purchases of moderate tonnages. Northern furnaces are quoting prices enabling them to control the local situation. Those who make the prices of scrap have caught the scent of better times and the market appears to be shaping itself for an advance.

Pig Iron.—The buying of pig iron for third quarter and last half has become general. Some of the leading melters have their iron unbought as yet, but most of them have inquiries out, while among the run of foundries buying has been going on steadily. A large number of purchases up to 1000 tons were made in the week. For grades of strictly Northern analysis local irons closely approximate $14, f.o.b. furnace, for No. 2 foundry and malleable, where average tonnages are involved. On those grades of iron which are competitive with Southern brands prices are being quoted for local delivery equivalent to $10 to $10.15, Birmingham, or about $14.50, delivered Chicago. Southern furnaces do not appear to be doing better than $10.25, Birmingham, or $14.60, delivered Chicago, but in all cases the shrewd buyer may use his analysis requirements to effect an advantageous quotation. The charcoal iron situation with so many furnaces out of blast and a tonnage on the books exceedingly heavy in proportion to the active capacity and stocks is strongly entrenched. Charcoal iron sales and inquiry are quite as active as for coke iron. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	14.25 to 14.75
Northern coke foundry, No. 2	13.50 to 14.00
Northern coke foundry, No. 3	13.25 to 13.50
Southern coke, No. 1 f'dry and 1 soft	15.10 to 15.35
Southern coke, No. 2 f'dry and 2 soft	14.60 to 14.85
Malleable Bessemer	13.75 to 14.25
Standard Bessemer	17.00
Basic	13.25 to 13.50
Low phosphorus	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

(*By Mail*)

Rails and Track Supplies.—Orders from the Chicago, Milwaukee & St. Paul, which include the release of about 20,000 tons to the Illinois Steel Company, and the distribution of a like amount to other leading rail mills were the center of interest in the rail market of the last week. An increase in specifications for spikes and bolts is reported. Prices for track supplies evidence anxiety of the mills to secure this business. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $25.50 to $26 f.o.b. mill net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—With the exception of 2320 tons for the Lake Street Bridge, Chicago, taken by the American Bridge Company some time ago and announced this week, and 1000 tons awarded to the same company by the Illinois Central for track elevation, contracts for fabricated steel were unimportant. Among those reported are 537 tons, Meritt Building, Los Angeles, to the Llewellyn Iron Works; 392 tons, Leavitt & Johnson Bank Building, Waterloo, Ia., to the Des Moines Bridge & Iron Company; 110 tons, Kern County, Cal., jail, to the Ralston Iron Works; 100 tons, Crocker residence, Hillsborough, Cal., to the Western Iron Works; 200 tons, Voorman apartments, San Francisco, to the Pacific Rolling Mill Company; 210 tons for the Chicago, Milwaukee & St. Paul to the Chicago Bridge & Iron Company; 196 tons, school building at Ely, Minn., 153 tons, theatre building, Ft. Wayne, Ind., and 230 tons for the St. Louis Southwestern railroad, all to the American Bridge Company. For plain material from mill, specifications were more liberal but in prices there is practically no change. We continue to quote for Chicago delivery from mill 1.28c.

For Chicago delivery from jobbers' stock we continue to quote 1.75c.

Plates.—The more general quoting of a 1.28c. Chicago price resulted in a more liberal release of specifications and the placing of some new business in small tonnage lots. In the main the market offers little that has a new interest. We continue to quote for Chicago delivery from mill 1.25c. to 1.28c.

For Chicago delivery of plates from store we quote 1.75c.

Sheets.—Despite the exceptionally low prices prevailing and the imminence of the third quarter period, there is comparatively little contracting. This may be attributed in large measure to the unwillingness of mills to commit themselves for the future, although they are eager for such business as may be shipped promptly. Reports of very low prices for immediate delivery specifications are freely encountered and quotations at $1 a ton less than are here quoted, are named. We continue to quote for Chicago delivery from mill:

No. 10 blue annealed, 1.48c.; No. 28 black, 1.98c.; No. 28 galvanized, 2.93c.

We quote for Chicago delivery from store as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.35c. to 2.45c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—The placing of contracts for implement bars is not yet under way. Neither is it clear, as yet, what disposition is to be made of the large tonnages which most of the implement interests will carry over on last year's contracts. It is possible that concessions from the mills regarding the extension of deliveries will have a bearing upon the price to be named for new contracts. The demand for reinforcing bars continues to result in the placing of a substantial tonnage, including about 2000 tons awarded at St. Paul, 400 tons for the postoffice at San Francisco and 300 tons for an auditorium at Sacramento, Cal. The bar iron business is much depressed and prices are at as low a level as in recent years. We quote for mill shipments as follows: Bar iron, 1.05c. to 1.10c.; soft steel bars, 1.28c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Orders for rivets are purely routine. A number of inquiries are noted looking to the placing of last half contracts for bolts, particularly from among the jobbers, but the mills do not appear very anxious to engage in last half contracts on the basis of prices now prevailing. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to ⅜ x 4 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, $6.20 off per cwt.; hexagon, $7 off per cwt. Structural rivets, ½ to 1¼ in., 1.73c. to 1.78c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.35c.; boiler rivets, 2.55c.; machine bolts up to ¾ x 4 in., 75-10; larger sizes, 70-10-5; carriage bolts up to ¾ x 6 in., 75-5; larger sizes, 70-10 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Cast Iron Pipe.—At Highland Park, Mich., a decision has been practically reached to install cast iron pipe for about 7000 ft. of the system to be constructed. This will amount to about 2000 tons. For the coming week the placing of 1500 tons at Salt Lake City and 500 tons at Columbus, Ohio, is scheduled. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for gas pipe.

Wire Products.—Except for a fairly well sustained business in fencing the wire trade has dwindled rather earlier than usual to midsummer proportions. Plain wire is now quoted on the basis of $1.35, Pittsburgh, to jobbers, and wire nails at $1.50. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.53; wire nails, $1.68 to $1.73; painted barb wire, $1.68 to $1.73; galvanized, $2.13 to $2.18; polished staples, $1.68 to $1.73; galvanized, $2.03 to $2.08, all Chicago.

Hoops and Bands.—There is practically no contracting under way and in fact little business of any kind is in sight. We quote for Chicago delivery of bands 1.33c. and for hoops 1.43c.

Old Material.—The slightest semblance of a more cheerful situation in the finished market has its impression on scrap values. Dealers in old material are now alert to the possibilities of advancing quotations and at least the declines which have been the rule for so many weeks past appear to have come to a halt. Railroad offerings last week brought somewhat higher prices. New scrap lists include 900 tons from the Chicago, St. Paul, Minneapolis & Omaha, 1700 tons from the Illinois Central, 500 tons from the Soo Line and 550 tons from Geo. W. Jennings, 328 Ellicott square, acting for the Chicago, Peoria & St. Louis Railroad. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$12.75 to $13.25
Old steel rails, rerolling	11.50 to 11.75
Old steel rails, less than 3 ft.	10.50 to 11.00
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	11.50 to 11.75
Heavy melting steel scrap	9.75 to 10.00
Frogs, switches and guards, cut apart	9.75 to 10.00
Shoveling steel	9.25 to 9.50
Steel axle turnings	6.75 to 7.25

Per Net Ton

Iron angles and splice bars	$12.00 to $12.50
Iron arch bars and transoms	12.00 to 12.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.25 to 12.50
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.50 to 8.75
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.75 to 10.00
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 7.75
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.75 to 10.25
Stove plate and light cast scrap	9.00 to 9.25
Grate bars	8.75 to 9.25
Railroad malleable	9.00 to 9.25
Agricultural malleable	8.00 to 8.50
Pipes and flues	6.50 to 7.00

Philadelphia

PHILADELPHIA, PA., June 15, 1914.

The movement has been a trifle better in some lines. Buying, however, continues on a moderate scale, representing the meagre needs of consumers. Sales of foundry pig iron aggregate slightly more. The recent increase in railroad buying, particularly in cars, has resulted in no marked increase in orders for materials coming to mills in this district. Pig-iron prices are practically unchanged. Steel billets are in little demand. Sheets have been a shade more active. Plates and shapes show little change, although miscellaneous orders may have been more numerous. Some fair tonnage in boat plates and shapes is before the trade, but there has been little new demand for extensive work in fabricated steel. While there is a little better feeling in the old material market, business drags.

Iron Ore.—The market is at a standstill, though deliveries on contracts are being regularly taken. Importations at this port in the week ended June 6, include 4350 tons from Cuba, 7100 tons from Africa, 6600 tons from Chile and 25,700 tons from Sweden.

Pig Iron.—Consumers are buying more freely against current needs, but in the majority of cases the tonnage taken ranges from one-third to two-thirds of what would be considered normal purchases and represents the decreased activity at the works of buyers. There is a relatively small proportion of inquiry for forward delivery and producers as a rule are discouraging business of that character at current prices. In some cases recently good-sized blocks were taken, largely for the reason that the iron was cheap. The leading foundry iron producers in this district are maintaining prices, standard brands of No. 2 X foundry being quoted at $14.75 to $15 delivered, while the inside price has been shaded in some instances 25c. a ton. The Norfolk & Western Railroad has closed for part of the iron recently inquired for but may consider additional tonnage. Cast-iron pipe makers have further iron under negotiation. In one case a round lot of special analysis iron is being figured on. In the higher foundry grades occasional 500-ton lots, for third quarter delivery, have been sold, but the bulk of the sales have been in small tonnages. A sale of several hundred tons of malleable, at about $15.50 delivered here is reported. A somewhat better movement in Virginia foundry iron is noted. More sales have been made for third quarter shipment at $12.75 furnace, for No. 2 X, and it is reported that the same figure could be done for second half. There has been no movement in rolling mill forge and prices are nominal. The recent inquiry on the part of a local consumer for 4000 tons of low phosphorus iron is still unclosed, but there have been sales of several thousand tons. Sellers of foreign low phosphorus are competing for the pending business. Basic iron is in-

active. The following range of prices represents the general market for standard brands, delivered in buyers' yards in this territory:

Eastern Penna. No. 2 X foundry	$14.75 to $15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.55 to 15.75
Virginia No. 2 plain	15.30 to 15.55
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	20.50 to 21.00

Ferroalloys.—The demand is sluggish, only odd carload inquiries for ferromanganese occasionally coming out. Both English and German 80 per cent. ferromanganese are quoted at $38 per ton, seaboard. Importations at this port last week included 1109 tons of ferromanganese from England and 5 tons of ferrochrome.

Bars.—While there has not been much new business in either steel or iron bars the trade feels more hopeful. There has been more small inquiry for ordinary iron bars, for which prices remain unchanged at 1.17½c. delivered, with the better grades ranging up to 1.22½c. and higher. Prices do not seem to be much of a factor, the lack of orders for finished products being the chief cause for the light buying.

Structural Material.—Eastern mills are refusing to consider business on which the delivery exceeds three months. Some offers involving shipments over the last half of the year, at current prices, have been turned down. Mill operations range from 50 to 60 per cent. and as current miscellaneous business has been below the average, unfilled contracts have, in some cases, been materially reduced. Several fair size contracts are still pending. That for structural material for the new Municipal Building, in Wilmington, Del., some 1800 tons, will no doubt go to the leading interest. Several small bridges for the city have come up for estimate. Prices are unchanged at 1.25c. to 1.30c. delivered here, on plain shapes for relatively early shipment.

Plates.—The heavier buying in other districts has not been felt as yet in this territory, but has resulted in a more cheerful feeling. Miscellaneous orders have been a shade more plentiful but there has been little in the way of large lot buying. A fair amount of boat plate business is before the trade. Fabricators also have some moderate inquiries out. Mill operations continue unchanged, ranging from 55 to 65 per cent. There has been no change in prices, 1.25c. to 1.30c. Philadelphia, representing the full range of the market.

Billets.—Notwithstanding the approach of the end of the first half of the year, there is almost an entire absence of new demand and mills in this district have but little third quarter business on their books. Even small orders have been fewer and mills are operating largely on specifications against contracts. Eastern makers are not disposed to meet recent reductions of 50c. a ton reported in the West and maintain prices of basic open-hearth rolling billets at $22.40 delivered here, with forging billets commanding an advance of $4 to $5 a ton over rolling billets.

Sheets.—Eastern mills are operating almost entirely on current small orders. Daily orders have enabled mills to operate close to full capacity, but seldom do they have enough business ahead to insure a week's rolling. The leading producer continues to maintain prices at 1.50c. here, for No. 10 blue annealed sheets.

Coke.—With the close of the first half of the year at hand, more contracting in foundry coke has developed, mostly for second half shipment. This is at prices ranging from $2.50 to $2.75 ovens. A fair business is being done in furnace coke, mostly, however, for prompt or near future shipment. Prompt foundry coke commands from $1.75 to $1.85 ovens while forward is held at $1.85 to $2 ovens. Freight rates to this city from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85; and Mountain, $1.65.

Old Material.—The market remains quiet. Odd lot sales continue to be made in specialties, but buying in regular grades has been light. Heavy melting steel has been inactive. Recent purchases of railroad offerings, which were taken at relatively high prices, are in instances being stored by purchasers. There has been a little buying of railroad wrought, which at quoted prices is considered the cheapest on the list. Quotations are unchanged, the following representing the market for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel	$10.50 to $11.00
Old steel rails, rerolling	12.00 to 12.50
Low phosphorus heavy melting steel scrap	14.50 to 15.00
Old steel axles	14.00 to 14.50
Old iron axles (nominal)	20.00 to 21.00
Old iron rails	15.00 to 15.50
Old carwheels	11.25 to 11.75
No. 1 railroad wrought	12.50 to 13.00
Wrought-iron pipe	9.50 to 10.00
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.00 to 8.50
Stove plate	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, June 16, 1914.

Iron Ore.—Two lots of non-Bessemer ore aggregating 80,000 tons were sold by one ore firm during the week. This business has given sellers some encouragement and they feel that other consumers will come in the market shortly and buy in a moderate way. Very little ore has been sold up to the present time outside of that taken by interests affiliated with ore firms. One leading firm reports that it has not sold a ton of ore this year. We quote prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—There is little activity in the local market, but buyers are showing a little more interest and some last half buying is expected shortly. One local consumer is understood to have tried to buy 5000 tons of No. 2 foundry for the last half at $13, delivered, but has been unable to place the iron at that price. The price in Cleveland continues nominally at $14.25, delivered, for No. 2, but with foundry iron selling at $13 in the Valley the corresponding delivered price in this city by Cleveland furnaces would normally be $13.75, and it is not probable that when the buying movement sets in the market will be established at a higher basis. Quotations for out of town shipment range from $13 to $13.50. The American Steel Foundries Company, which had an inquiry for 10,000 tons of basic pending for several weeks, has come out with a new inquiry for 4000 to 5000 tons. Sales of foundry as low as $12.75 are reported in Buffalo, but it is stated that this is resale iron. Some small lot sales of Southern iron are being made on the basis of $10.50, Birmingham, for the last half, but the market is not firm and lots of 500 tons can be had at $10.25 for No. 2. The leading sanitary interest has an inquiry out for 500 to 1000 tons of No. 2 Southern for delivery at its Louisville plant during July and August. We quote for Cleveland delivery as follows:

Bessemer	$14.90
Basic	$13.75 to 13.90
Northern No. 2 foundry	14.25
Southern No. 2 foundry	14.85
Gray forge	13.50
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.25

Coke.—The foundry coke market is quite active. There has been considerable contracting during the week for a year's supply from July 1. Prices are softer. Contracts for the best makes with one exception, can be had at $2.50 for delivery during twelve months. For spot shipment the quotations range from $2.35 to $2.50. Furnace coke is quiet with prices unchanged at $1.75 per net ton for spot shipment and $1.85 to $2 for contract.

Finished Iron and Steel.—Interest in finished lines still centers in contracts with the implement makers. Many of the negotiations between buyers and sellers have so far resulted in a deadlock so that not much contracting has been done. The two extremes in the negotiations are represented by offers of buyers to contract for twelve months at 1.15c. with the privilege of specifying at 1.10c., when that is the going price, and the

effort of sellers to get contracts at 1.15c. for the third quarter and 1.20c. for the fourth quarter, no contracts to extend beyond January 1. Some business has been placed at 1.15c. through the last half and in other cases at 1.15c. for the third quarter and 1.20c. for the fourth quarter. Considerable tonnage in hard steel contracts has been tied up by the implement makers at 1.10c. for the last half. For spot shipment soft steel bars are freely offered at 1.10c. The bar iron market is weak and western mills are making sales at 1c. to 1.02½c. at mill. The demand is light. Both local mills will be shut down until after July 1. We quote iron bars at 1.15c., Cleveland. The general quotation on plates is 1.10c., although some business is being taken at $1 a ton higher. The structural situation has improved. The Forest City Steel & Iron Company has taken 2000 tons for the Siegel Building in Detroit and 500 tons for a new factory building for the Cleveland Metal Products Company. T. H. Brooks & Co. have taken 200 tons for an extension to the plant of the Cleveland Worsted Mills Company. The Donovan Wire & Iron Company, Toledo, has taken 450 tons for the Dime Savings Bank Building in that city. Structural work in Cleveland aggregating about 3000 tons, previously reported as pending, has not yet been placed. The demand for sheets is not active and makers are reported to have large stocks on hand. Not much contracting is being done for the third quarter. We quote black sheets at 1.80c. for No. 28, galvanized at 2.75c. to 2.80c. for No. 28, and blue annealed at 1.35c. for No. 10. Warehouse prices are unchanged at 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is very light. Few consumers are contracting for the last half. Prices are irregular. Rivet consumers have not yet commenced to contract for the last half requirements. Rivet prices are unchanged at 1.50c. for structural and 1.60c. for boiler. We quote discounts as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer, 75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, $6.30 off; hexagon h.p. nuts, blank or tapped, $7.20 off; c. p. c. and t. square nuts, blank or tapped, $6 off; hexagon, ⅝ in. and larger, $7.20 off; 9/16 in. and smaller, $7.80 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—The feeling in the scrap iron trade is slightly better, but the volume of business is not improved. Two local consumers are buying small lots of heavy melting steel that they can pick up at low prices and are taking shipments rather slowly. Only one Youngstown mill is in the market. This consumer is taking on some heavy melting steel at $11.75. Local prices generally are unchanged. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Old steel rails, rerolling	$11.50 to $12.00
Old iron rails	13.00 to 13.50
Steel car axles	15.00 to 15.25
Heavy melting steel	10.00 to 10.50
Old carwheels	11.25 to 11.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.25 to 10.50
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton

Iron car axles	$17.25 to $18.25
Cast borings	5.50 to 6.00
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.50 to 8.75
No. 1 busheling, old	8.00 to 8.25
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.50 to 10.75
Stove plate	7.50 to 8.00

The total amount of manganese ore exported from India for the year ending with March, 1914, was 718,049 tons, as compared with 708,081 tons in the preceding 12 months. The United Kingdom took the largest portion in each case, while Germany was among those taking the smallest amounts.

Cincinnati

CINCINNATI, OHIO, June 17, 1914.—(*By Wire.*)

Pig Iron.—A considerably larger tonnage of both Northern and Southern iron has been sold in this territory in the past few days. This was divided up into small lots, principally for third quarter shipment. Although the melt has not increased, foundry stocks are evidently being depleted. Shipments on old contracts are going forward at a more satisfactory rate. Prices are soft, and it is known that a producer in the Hanging Rock district sold a considerable quantity of iron below $13.50, Ironton basis, for third quarter shipment. This special lot of iron is now off the market. Hanging Rock furnaces are making an effort to hold firm at $13.50, Ironton, and they are willing to make contracts throughout the year at this figure. Southern iron prices are somewhat unsettled and $10.25, Birmingham basis, can be done for prompt shipment, although the majority of contracts in this territory are made on a basis of $10.50. Recent Southern iron sales include 1000 tons of special analysis iron for a southern Indiana firm. Smaller tonnages were taken by nearby concerns at the regular market prices for last half shipment. A Michigan consumer bought 500 tons of Northern foundry for third quarter shipment and 700 tons of Ohio silvery iron went to a northern Ohio melter. Inquiries include one from central Ohio for 500 tons each of Northern and Southern foundry iron for last half delivery. In addition to the basic inquiry previously reported there is a negotiation for a comparatively small quantity that is expected to be closed at an early date. Malleable continues dull. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$14.00 to $14.50
Southern coke, No. 2 f'dry and 2 soft	13.50 to 14.00
Southern coke, No. 3 foundry	13.00 to 13.50
Southern No. 4 foundry	12.50 to 13.00
Southern gray forge	12.00 to 12.50
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.70 to 16.20
Southern Ohio coke, No. 2	14.70 to 15.20
Southern Ohio coke, No. 3	14.45 to 14.70
Southern Ohio malleable Bessemer	14.70 to 15.20
Basic, Northern	14.70 to 15.20
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(*By Mail*)

Coke.—There is more interest taken in foundry coke. Although contracting is limited to this year's requirements, to some extent this is due to the unwillingness of coke producers to take on long-time contracts at present quotations. On the other hand, many jobbing foundries are content to await developments and run the risk of paying a higher price for raw materials. This same situation exists with the furnace coke consumers. Furnaces which ordinarily contract for a 12 months' supply are not willing to commit themselves just now, and coke oven operators are not trying to force them to do so. Prompt shipment 48-hr. coke is sold in the Connellsville district around $1.75 to $1.85 per net ton at oven. Wise County and Pocahontas furnace grades are about 10c. a ton higher, but foundry coke in the last-named districts does not carry the usual differential and as low as $2.25 per net ton can be done, with Connellsville foundry coke quoted around $2.40 to $2.50 for nearby shipment. Contract prices, in all three fields, range from $2.40 to $2.75 per net ton at oven.

Finished Material.—Local warehouses report a better demand for structural shapes and reinforcing steel bars for concrete structures. There is also considerable bridge work in sight. Both black and galvanized sheets also continue to show some improvement, but this is mostly confined to the increased inquiry, and not to actual orders received. Railroad track material is being ordered only in small quantities. Hoops and bands are also quiet, although it is the season when there should be considerable business in this line. We quote No. 28 gauge black sheets at 1.95c. and galvanized at 2.90c. to 2.95c. f.o.b. Cincinnati, or Newport, Ky. Store prices on steel bars are 1.75c. to 1.80c. and on small structural shapes 1.85c. to 1.90c. The demand for barbed wire is slightly on the mend, as country

merchants are ordering an additional supply to carry them through the summer.

Old Material.—It is generally understood among scrap iron dealers that the market cannot improve until the price of pig iron reaches a higher level. Nearly all dealers have large stocks on hand, and are not making any strenuous efforts to take on larger tonnages. The consumption of scrap iron is not up to the average, and as a consequence, the larger users are not in the market. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$6.75 to	$7.25
Old iron rails	11.75 to	12.25
Relaying rails, 50 lb. and up	19.75 to	20.25
Rerolling steel rails	10.75 to	11.25
Melting steel rails	9.25 to	9.75
Old carwheels	10.25 to	10.75

Per Net Ton

No. 1 railroad wrought	$8.75 to	$9.25
Cast borings	4.50 to	5.00
Steel turnings	4.50 to	5.25
Railroad cast scrap	9.25 to	9.75
No. 1 machinery cast scrap	10.25 to	11.25
Burnt scrap	6.00 to	6.75
Old iron axles	16.75 to	17.25
Locomotive tires (smooth inside)	9.75 to	10.25
Pipes and flues	6.25 to	6.75
Malleable and steel scrap	7.25 to	7.75
Railroad tank and sheet scrap	5.25 to	5.75

Buffalo

BUFFALO, N. Y., June 16, 1914.

Pig Iron.—The market is quieter as compared with last week, although quite a good deal of inquiry has been received from outside districts, particularly New England and also from Canadian points. From the district strictly tributary to this market with the exception of Canada, less interest has been shown. An order of 5000 tons of basic from a New York state car coupler company and also considerable foundry iron totaling about 6000 tons from Canada have been placed. The consuming trade of the district continues to report pronounced dullness. The range of prices with inconsiderable exceptions is from $13 to $14 f.o.b. furnace, for the lower and higher grades and differentials for the higher silicons have in some cases been obliterated. The schedule is not well defined in consequence, and as nearly as can be approximated prices are as follows, f.o.b. furnace for current and third quarter delivery:

No. 1 foundry	$13.50 to $14.00
No. 2 X foundry	13.00 to 13.50
No. 2 plain	13.00 to 13.25
No. 3 foundry	13.00
Gray forge	13.00
Malleable	13.00 to 13.50
Basic	13.50 to 13.75
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—Some inquiries relating to contracts are being received from users of bar material, but the attitude of the mills is one of waiting. Orders are being received at about the same rate as for several weeks past for immediate and current needs. Selling agencies are endeavoring to maintain 1.15c., Pittsburgh, and a good many carload lot orders are reported as having been booked at this price. For desirable specifications and large tonnages, it is rumored this price has been shaded in some instances. Sheet mills are running full, having about all the tonnage booked that they can handle. The week has developed fairly good business in fabricated structural lines. The Canadian John Parker Company, Toronto, is taking bids for 1400 tons for the Hamilton Hotel, Hamilton, Ont. Bids were opened June 12 for a highway bridge at Cobleskill, N. Y., 100 tons, and in Albany to-day for 450 tons for the Normanskill viaduct to be built by the State. Revised bids are being taken for the Model Theatre, Buffalo, 100 tons. The Progressive Steel Company, Buffalo, has steel contracts for the department store for Siegrist & Fraley, Buffalo, and for a North Tonawanda school, 100 tons each, and the Buffalo Structural Steel Company for the Evangelical Lutheran Church, Buffalo, about 100 tons.

Old Material.—The market is quiet with very little material moving. Several consumers have directed temporary suspension of shipments on contracts. Turnings and borings are the most active commodities. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel	$10.25 to	$10.50
Low phosphorus steel	14.50 to	15.00
Boiler plate sheared	11.50 to	12.00
No. 1 railroad wrought scrap	10.50 to	11.00
No. 1 railroad and machinery cast	10.75 to	11.25
Old steel axles	12.75 to	13.25
Old iron axles	19.50 to	20.50
Old carwheels	10.50 to	11.00
Railroad malleable	10.00 to	10.25
Machine shop turnings	5.25 to	5.75
Heavy axle turnings	7.50 to	8.25
Clean cast borings	6.00 to	6.50
Old iron rails	15.00 to	15.50
Locomotive grate bars	8.50 to	9.00
Stove plate (net ton)	9.75 to	10.00
Wrought pipe	7.50 to	8.00
Bundled sheet scrap	6.25 to	6.50
No. 1 busheling scrap	8.25 to	8.75
No. 2 busheling scrap	5.75 to	6.25
Bundled tin scrap		10.50

Birmingham

BIRMINGHAM, ALA., June 15, 1914.

Pig Iron.—Report is made of total sales of 18,000 tons for third and fourth quarter by a Birmingham concern at $10.25 and $10.50 respectively. The admitted basis for spot and third quarter is the former price. This holds even in Southern territory and for small lots, which is the same as to say that the spot maximum is $10.25. Apparently there is nothing done under that. A large tonnage offer might bring concessions. Some of the larger operators are not at all pleased with the situation. They regard the low prices as a dead offset to profits and the general volume of business outside of the pipe company purchases is disappointing. On of the largest makers sold only 7000 tons in the first ten days of June when the pipe interests were buying, having declined an offer of $10 for 35,000 tons, the gray forge bookings in this lot to be on the $9 basis. The pipe iron buying failed to stimulate the price tone and purchases, large as they have been for the time in which bookings were made, are small when one takes note of the long period of non-buying preceding. Total sales for the week, however, have probably approximated 30,000 tons. Operators are making no predictions, but they continue to be severe in condemnation of the Underwood tariff so far as iron and steel are concerned. Some declare that if the $10 level is reached there will be a further curtailment of output. Reports from finishing mills are not encouraging, although rail manufacture on a continuous basis seems assured. Wire fencing is the only steel product reported as really active. We quote pig iron per gross ton, f.o.b. Birmingham furnaces, for third and fourth quarters as follows:

No. 1 foundry and soft	$10.75 to	$11.00
No. 2 foundry and soft	10.25 to	10.50
No. 3 foundry	9.75 to	10.00
No. 4 foundry	9.50 to	9.75
Grey forge	9.25 to	9.50
Basic	10.00 to	10.25
Charcoal	23.50 to	24.00

Cast-Iron Pipe.—Several orders for large sizes of pipe have been received in the past week and inquiry indicates a disposition to enter into additional contracts at prevailing prices. Plants are operating at 60 per cent. capacity, one interest having put on an additional pit. The demand for sanitary pipe has fallen off somewhat. We quote per net ton f.o.b. maker's yards as follows: 4 inches, $20.50; 6 inches and upwards, $18.50 with $1 added for gas pipe.

Coal and Coke.—The United Fruit Company has given a contract for 50,000 tons of coal for delivery at the port of Mobile to the Warrior Black Creek Coal Company. An order for 1000 tons of coke for western sugar refineries was placed. Outside of these the coal and coke markets are featureless, but prices continue firm. We quote on coke per net ton f.o.b. ovens as follows: Furnace coke, $2.75 to $2.90; foundry $3 to $3.25.

Old Material.—The scrap dealers are taking it philosophically. Business is of small volume, with fluctuating prices. Light cast is in greatest demand.

We quote per gross ton f.o.b. dealers' yards, as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., June 15, 1914.

Pig Iron.—The little spurt in buying which developed recently lost some of its force during the past week largely because of the over-anxiety of one or two pig-iron producers who, in their desire to get business started, cut prices practically to $10.25 for No. 2 Southern, Birmingham basis, and thus have caused prospective buyers to hesitate still further before entering the market, in the hope of additional concessions. One inquiry now out is for about 2500 tons of No. 2, Southern and Northern combined and the rest for small lots only. Sales during the week were in small quantities, with the exception of one of 600 tons of No. 2 Southern, the remainder of the business ranging down from 200 tons to carload lots. Most furnace representatives are holding No. 2 Southern at $10.50, Birmingham.

Coke.—Annual contracts are up for consideration, but closings are being delayed on account of inability to agree on prices. By-product coke stands at $5.20, delivered, St. Louis.

Finished Iron and Steel.—An improved demand for structural material and reinforcing bars has developed during the past week, the gain being about 10 per cent. More interest is shown and orders, though small, are coming out much more freely than for many weeks. Fabricators report a better outlook and anticipate an early improvement in business. Standard rails, barring a sale of about 20 miles, have shown nothing new. Light rails have improved, the coal mines having entered the market in preparation for the coming winter's work. An order from the Wabash, practically closed, for 60 locomotives, is also helping to improve the feeling as to railroad buying prospects in this section.

Old Material.—Conditions continue to be ruled by the dealers, there being no intimation, apparently, from the consumers that they are in line for scrap for early use. The lists reported last week went at very low prices. New lists include one of 600 tons from a local industry, 1400 tons from the Missouri, Kansas & Texas, 1000 tons from the Omaha & St. Louis and some small lots. Relayers have shown a decidedly better demand, but without affecting the quoted price as yet. We quote dealers' prices f.o.b. St. Louis, as follows:

Per Gross Ton

Old iron rails	$10.50 to $11.00
Old steel rails, rerolling	10.50 to 11.00
Old steel rails, less than 3 ft.	10.00 to 10.50
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.50 to 11.00
No. 1 railroad heavy melting steel scrap	9.75 to 10.25
Shoveling steel	7.50 to 8.00
Frogs, switches and guards cut apart	9.50 to 10.00
Bundled sheet scrap	4.25 to 4.75

Per Net Ton

Iron fish plates	$9.50 to $10.00
Steel angle bars	8.00 to 8.25
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	10.50 to 11.00
No. 1 railroad wrought	7.50 to 7.75
No. 2 railroad wrought	7.25 to 7.50
Railroad springs	8.00 to 8.50
Steel couplers and knuckles	8.25 to 8.75
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.25 to 7.75
Mixed bcrings	3.25 to 3.75
No. 1 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	5.25 to 5.75
No. 1 cast scrap	8.50 to 9.00
Stove plate and light cast scrap	7.00 to 7.50
Railroad malleable	7.00 to 7.50
Agricultural malleable	6.50 to 7.00
Pipes and flues	5.00 to 5.50
Railroad sheet and tank scrap	5.00 to 5.50
Railroad grate bars	6.50 to 7.00
Machine shop turnings	4.25 to 4.75

The National Steel Rail Company, St. Louis, through I. H. Cohn, president, has purchased from the Chicago & Alton Railroad some 70 track miles of 60, 70 and 80 lb. section relaying steel rails. The purchase was a cash transaction. It is understood part of the rails are sold to an interurban line in the Southwest.

San Francisco

SAN FRANCISCO, CAL., June 9, 1914.

The distributing trade has held up fairly well, with indications of gradually increasing activity in the smaller consuming trades. Prices, however, remain extremely low and local interests see nothing to indicate an upward movement. Merchants, though anticipating some acceleration after the harvest season, are very skeptical as to the prospect of a really large movement. The replenishing of stocks is on a very conservative scale.

Bars.—Shipments of foreign material on contracts placed late last year are arriving at frequent intervals, providing fairly well for routine requirements. Many buyers prefer to rely on the local stock of the leading American interest, rather than place orders for direct shipment. There is very little contracting for extended delivery. More demand is noted for reinforcing bars, with several important inquiries, including about 2000 tons for state highway work, over 500 tons for a Seattle warehouse, etc., but competition is excessive. Local mills are running at a little better rate. For ordinary inquiries, reinforcing bars are quoted at about 1.85c.

Structural Material.—A marked curtailment in building is noted in southern California. Contracts have not been let on the more important projects recently mentioned, and small jobs, though fairly numerous, are not sufficient to keep the local fabricators occupied. Figures are being taken for a hotel on Powell street near Post, and for a six-story apartment house on Sutter street near Taylor. Plans will soon be out for a seven-story building at Mason and Bush streets, a five-story hotel at Eddy and Fillmore, and a five-story addition to Lane Hospital. Plans have been approved for a steel frame superstructure for Pier 39, to be two stories, 104 x 900 ft. The general contract has been let for a bridge at Paso Robles, Cal., requiring about 250 tons.

Rails.—The largest order recently placed was about 2500 tons for the Northwestern Pacific line to Eureka. The demand for mine rails and other light material has dropped off a little. Several small lots of foreign light rails have arrived for local merchants.

Plates.—Heavy shipments are now coming in on old contracts, and there is still a very good tonnage in prospect, especially for oil development. An important inquiry is expected shortly from the Valley Pipe Line Company. The local jobbing trade remains rather quiet.

Sheets.—The tonnage of galvanized and black sheets booked by the mills in the last month has been rather disappointing, as some large consumers have not taken the amounts expected. The jobbing business, however, has been fair.

Standard Pipe.—The Valley Pipe Line Company has placed with the local office of the Youngstown Sheet & Tube Company what is said to be the largest order for line pipe ever booked in California. It amounts to about 15,000 tons, including 115 miles of 8-in. and 57 miles of 10-in. pipe. Aside from this nothing of importance has been done in oil country goods. No large stocks are being put in, but supplies have become so depleted that a more liberal buying policy is necessary.

Cast Iron Pipe.—It is rumored that San Diego will soon be out for about 8000 tons. The town of Santa Ana will take figures June 15 for carload lots.

Pig Iron.—Contracts are still being booked for fall delivery, principally of English iron, but melters are taking hold rather slowly. Middlesbrough iron, for shipment on sailing vessel, is quoted at $19.50 to $20, per gross ton.

Coke.—A fair tonnage of German Syndicate coke has

been booked for future delivery. Spot offerings are held at about $13 to $14 per net ton, while German Syndicate coke for future delivery is quoted at about $10 per gross ton.

Old Material.—Some of the local consumers have lately taken on a little steel melting scrap at about $6 to $7 per gross ton, and outside buyers have picked up a few odd lots around the country at about the equivalent of these prices in San Francisco. There is practically no demand for wrought iron and soft steel scrap, which is nominally held at about $5 to $6 per net ton.

Boston

BOSTON, MASS., June 16, 1914.

Old Material.—Conditions remain unchanged. The tendency of the market is downward, if anything, but not in a sufficient way to alter the accepted prices. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.25 to $8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.25 to 13.75
Old iron axles	21.25 to 21.75
Mixed shafting	12.00 to 12.25
No. 1 wrought and soft steel	9.00 to 9.25
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.50 to 7.75
Cotton ties (bundled)	6.00 to 6.25
No. 2 light	3.75 to 4.25
Wrought turnings	5.00 to 5.50
Cast borings	5.00 to 5.50
Machinery, cast	11.25 to 11.50
Malleable	8.00 to 8.25
Stove plate	7.75 to 8.00
Grate bars	5.25 to 5.50
Cast-iron carwheels	11.00 to 11.25

New York

NEW YORK, June 17, 1914.

Pig Iron.—A good many foundry interests are feeling the market for the last half, but buying has not been important in the week, apart from one or two quiet transactions. In New York City one inquiry for several thousand tons has come up and there are two others for 1000 tons each from near-by territory. In nearly all cases the iron is wanted for delivery in the second half. Buyers concede that prices are low, but they have talked this for so long that it is not a moving consideration, and there is little fear on the part of most of them that the market will get by them. A Poughkeepsie inquiry for 2000 tons has been before the trade for several weeks. The business has just been closed and is equally divided between Buffalo and eastern New York furnaces. Little has developed in New England. Occasionally Virginia iron is heard of, sales being at a shade below $12.75 at furnace for No. 2 X. The Buffalo basis is variously reported. In some cases tidewater deliveries can be had at a little below $14.75, but the $13 Buffalo basis has been fairly well held on average business. The pig iron trade has been watching closely the award of segment castings for the East River tunnels, and it is pretty well assured that the pig iron will be divided between Eastern and Central Western furnaces, since it is believed the segment contract will be divided between the two sections. The total of castings required is 73,600 tons. The pig iron contract amounts to something under 60,000 tons. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.75 to $15; No. 2 X, $14.50 to $14.75; No. 2 plain, $14.25 to $14.50; Southern iron, $15 to $15.25 for No. 1 and $14.75 to $15 for No. 2.

Ferroalloys.—Extreme dullness pervades the market for both ferromanganese and ferrosilicon with very little inquiry or sales of even small lots. Quotations remain unchanged at $38, seaboard, for either the English or German 80 per cent. ferromanganese and at $71 to $73, Pittsburgh, for 50 per cent. ferrosilicon, depending on the tonnage.

Finished Iron and Steel.—Dullness is conspicuous. The lettings in structural steel are in the aggregate not large, few new projects of size have come to light, contracting for steel bars does not seem to have progressed any in the past week and too little has been doing to test prices. Some betterment in the volume of bar iron is reported. The Bridge Builders & Structural Society reports that in May 57 per cent. of the capacity of the bridge and structural shops of the country was contracted for, against 88 per cent. in April. The shops of the American Bridge Company are still well engaged, operating at over 90 per cent. capacity, at least in the East. Incidentally another block of the subway work has finally been awarded to that company, involving 4800 tons. The items of interest in railroad cars are the purchase of 750 coal cars by the Pittsburgh, Shawmut & Northern of the American Car & Foundry Company, and that in addition to its recent purchase, Delaware, Lackawanna & Western is now in the market for 200 automobile cars, 500 box cars, 48 all-steel suburban coaches and 7 combination cars, and the St. Paul is in the market for 200 tank cars. The New Haven and the Erie both have small inquiries in the market, but generally railroad structural work is absent from the market. The George A. Fuller Company is reported to have the general contract for a municipal building in Waterbury, Conn., involving 1200 tons, and a 650-ton loft building in Long Island City is up for figures. Among contracts lately awarded for buildings, bridges and cars are the following: Atlantic Coast line, 100 logging cars to the Cambria Steel Company; The Chicago, Milwaukee & St. Paul, 10 passenger equipment cars to the Standard Steel Car Company and 19 to the Barney & Smith Company; New York, New Haven & Hartford, 1400 tons for the Pawtucket station to the Levering & Garrigues Company; Anderson Building, Fifth avenue and Thirty-eighth street, 2200 tons, to Post & McCord; Central Railroad of New Jersey, for car shops, etc., 200 tons, about half to the Eastern Steel Company and the remainder to the Levering & Garrigues Company; St. Mary's Hospital, Hoboken, 500 tons to the Fagan Iron Works; Penobscot Chemical Fiber Company, Great Works, Maine, 200 tons to the Boston Bridge Works; highway bridge, Lawrence, Mass., 350 tons, to the McClintic-Marshall Company; Pennsylvania Railroad, 150 tons, to the Phoenix Bridge Works; Elks Club, Baltimore, 400 tons, to the Chesapeake Iron Works; a garage at Elizabeth, N. J., 150 tons, to the Hedden Iron Construction Company, and Nordheimer building, Toronto, Ont., 500 tons, to the Dominion Bridge Works. We quote mill shipments of steel bars at 1.12½c. to 1.15c. Pittsburgh, or 1.28½c. to 1.31c. New York; plates and structural, 1.10c. to 1.15c. Pittsburgh, or 1.26c. to 1.31c. New York, and iron bars at 1.22½c. to 1.27½c. New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c. New York, and plates and shapes, at 1.85c. to 1.90c.

Old Material.—The market illustrates this week the alternation between the hopeful attitude of one week and the more dubious feeling of the week following that has been noticed in the past month. The situation in heavy melting steel scrap in eastern Pennsylvania is unchanged. Mills are not getting scrap on $10 offers and dealers are not able to realize $10.50. With transactions very light, changes from last week's quotations are immaterial. The prices below represent the range of dealers' quotations, per gross ton, New York:

Old girder and T rails for melting	$8.00 to $8.50
Heavy melting steel scrap	8.00 to 8.50
Relaying rails	21.50 to 22.00
Rerolling rails	10.00 to 10.50
Iron car axles	17.50 to 18.00
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	10.00 to 10.50
Wrought-iron track scrap	9.00 to 9.50
No. 1 yard wrought, long	8.50 to 9.00
No. 1 yard wrought, short	8.00 to 8.50
Light iron	3.25 to 3.50
Cast borings	5.50 to 5.75
Wrought turnings	5.25 to 5.50
Wrought pipe	7.50 to 8.00
Carwheels	9.50 to 10.00
No. 1 heavy cast, broken up	10.25 to 10.75
Stove plate	7.50 to 8.00
Locomotive grate bars	6.00 to 6.25
Malleable cast	7.25 to 7.75

Cast-Iron Pipe.—No other public lettings have been learned of in addition to those mentioned last week. Nothing has occurred to change the outlook and makers are, if anything, more hopeful of better prices before long. Carload lots of 6-in. continue to be available at $20.50 to $21 per net ton, tidewater.

German Steel Export Prices Up

Three-Year Prussian Rail Contracts at Lower Prices—Pig Iron Better

BERLIN, June 5, 1914.

The situation has changed but little, but the prospects for perfecting trade combinations in finished steel products are still regarded as favorable enough to stimulate export prices. For several successive weeks these have been advancing. A Cologne dispatch of yesterday reported that bars have been further advanced to 86s. to 88s. ($20.93 to $21.42), rivet bars to 88s. to 89s. (21.42 to $21.66), and ordinary wire, up to No. 8, from 115s. to 120s. ($27.98 to $29.20), all f.o.b. Antwerp. In the meantime the Prussian railroads have at last come to terms with the Steel Works Union regarding contracts for rails and ties for the three years 1915-17 inclusive. Reductions of 4 marks (95c.) for rails and 4.50 marks ($1.07) for ties were agreed to. The new prices will be 114 marks ($27.13) for rails and 104.50 marks ($24.87) for ties. It is understood that the quantities to be taken have been left open.

The shipments of pig iron in May are reported to have reached about 78 per cent. of the Syndicate's allotments, which denotes a slight improvement upon the April movement. Market reviews this week are otherwise pessimistic, especially as regards the position of finished goods. Notwithstanding the upward movement in bars for export the enormous overproduction favors buyers, and these are not inclined to increase their takings. Similar conditions prevail in heavy plates. Home prices of 96 to 98 marks ($22.85 to $23.32) are quoted, while it is asserted that on export orders hardly more than 95 marks ($22.61) on board ship is obtainable. Unfavorable business in light plates is also reported. Some of the works which enjoy special market advantages are demanding as much as 115 marks ($27.37), but most of them are selling as low as 110 marks ($26.18) and the export price is hardly above 100 marks ($23.80) at seaport. In steel tubing the situation remains highly unsatisfactory.

Further advances in steel export prices have been reported from Belgium, and a few days ago the Steel Comptoir took foreign contracts for about 10,000 tons of steel rails, including 4500 for Sweden and 2000 tons for Spain.

Negotiations have now begun for organizing the German light plate trade.

Thyssen's new establishment at Hagendingen has just issued its annual report. It declared its first dividend, namely, 4 per cent., after writing off 4,550,000 marks. The sixth blast furnace will be completed in September.

The Pig Iron Syndicate has just decided to raise the bonus on iron used in making export steel products to 5.50 marks ($1.31) a ton after July 1; it is now 4.50 marks ($1.07.)

British Market Featureless

Buying Is on a Small Scale and Pig Iron Is Weaker

(*By Cable*)

LONDON, ENGLAND, June 17, 1914.

The market continues dull and featureless. Buying by consumers is hand to mouth, while speculation is stagnant. Supplies of pig iron are closely regulated to the demands; hence the tone remains firm. Hematite iron shows a weaker tendency and far forward business is being done at material concessions. Rubio ore, however, is firmer, partly because Spanish mine owners are closing their mines rather than cut prices. Semi-finished and finished steel are unchanged, but the full advance lately recorded on the continent is hardly maintained, the rush of merchants covering having subsided. A fair line of tin plates for the East have been sold at 12s. 4½d. ($3.01) f.o.b. Swansea for quarters. Stocks of tin plates are 142,139 boxes. The stocks of pig iron in Connal's stores are 85,597 gross tons, against 86,036 a week ago. The Steel Corporation has booked 4800 tons of tram rails for New South Wales. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. ($2.92) against 12s. 1½d. ($2.95) a week ago.

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 51s. 1d. ($12.43), against 51s. 2d. ($12.45) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. 6d. ($12.53).

Hematite pig iron, f.o.b. Tees, 60s. 6d. ($14.72), against 61s. ($14.84) a week ago.

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. ($21.89).

Steel bars, export, f.o.b. Clyde, £5 17s. 6d. ($28.59).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 12s. 6d. ($27.37).

Steel ship plates, Scotch, delivered local yards, £5 13s. 9d. ($27.67), against £5 15s. ($27.98) a week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. ($42.58).

Steel rails, export, f.o.b. works port, £5 15s. ($27.98).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 78s. ($18.98).

German 2-in. billets, f.o.b. Antwerp, 73s. ($17.75).

German basic steel bars, f.o.b. Antwerp, £4 4s. to £4 5s. ($20.43 to $20.67) for prompt shipment and £4 6s. to £4 8s. ($20.92 to $21.41) for forward delivery.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. ($24.82 to $25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft., 9s. to 10s. ($2.19 to $2.43). Iron and steel sheets, 11s. to 12s. 6d. ($2.68 to $3.04). Beams up to 30 ft., 12s. 6d. ($3.04).

Metal Market

NEW YORK, June 17, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York				Lead		Spelter	
June	Lake	Electrolytic	Tin, New York		New York	St. Louis	New York	St. Louis
10	14.12½	13.87½	31.15		3.90	3.80	5.10	4.95
11	14.12½	13.87½	31.15		3.90	3.80	5.10	4.95
12	14.12½	13.87½	30.80		3.90	3.80	5.10	4.95
13	14.12½	13.87½	.....		3.90	3.80	5.10	4.95
15	14.12½	13.87½	29.87½		3.90	3.80	5.10	4.95
16	14.12½	13.87½	30.05		3.90	3.80	5.10	4.95

Copper is dull and sellers are discouraged. Tin is inactive and unsettled. Lead continues unchanged. Spelter and antimony are lifeless.

New York

Copper.—The market has taken on a lifeless attitude and very little business has been transacted since the last report. There were moderate sales of electrolytic last week Wednesday, Thursday and Friday which were brought about by the drop in price to 14c., delivered, cash 30 days. Since then buying has fallen off and only occasional sales have been reported. There is no life or snap and sellers appear discouraged. In Lake there has been no feature. Prime Lake can be obtained at 14.12½c. to 14.25c., while other brands, not prime, can be had at 14c. or even a little less. Copper sheets have been reduced ¼c. The quotations in London to-day are £61 12s. 6d. for spot and £62 5s. for futures. The exports for this month total 17,708 tons.

Tin.—The market is unsettled. Sales which have

been made during the past week are only light in volume and almost without exception they have been for prompt or early delivery. In futures there has been no business. Some deliveries against old contracts have not been taken up because of this unsettled condition. An incident which has contributed to the unsettled state was the sale, under the rule, on the exchange on Monday, of 25 tons, ex-steamer Atholl, at 29.50c. This is the lowest price in years. Spot supplies are so closely concentrated that it is difficult to get them, especially for Manhattan delivery. The New York quotation yesterday was 30.05c. and the London prices to-day are £136 for spot and £137 15s. for futures. The arrivals this month total 1730 tons and there is afloat 2723 tons.

Lead.—While the tone is firm the dullness that has characterized the market for some time continues. Sentiment is contradictory. Some sellers claim that there is a fair demand while others assert that the contrary condition prevails. There is little disposition to shade prices and 3.80c., St. Louis, is the bottom quotation. Consumption is fairly good in some lines but in others it is slack. The New York price is 3.90c.

Spelter.—Spelter continues dull and without change at 5.10c. to 5.15c., New York, and 4.95c., St. Louis.

Antimony.—With abundant stocks and very little demand the market continues featureless. Hallett's is quoted at 6.87½c. to 7c., Cookson's, 7.12½c. to 7.20c. and other grades, 5½c. to 5¾c.

Old Metals.—The market is dull and weak. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	13.00 to 13.25
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.50 to 12.00
Brass, heavy	8.50 to 8.75
Brass, light	7.00 to 7.25
Heavy machine composition	11.75 to 12.00
Clean brass turnings	8.50 to 8.75
Composition turnings	10.50 to 10.75
Lead, heavy	3.70
Lead, tea	3.40
Zinc scrap	3.85

Chicago

JUNE 15.—Although values in the metal market showed by their declining tendency the pressure of unfavorable conditions, the sharp break that was anticipated in some quarters did not materialize. We have revised our quotation and quote as follows: Casting copper, 14c. to 14.25c.; Lake copper, 14.25c. to 14.50c. for prompt shipment; small lots, ¼c. to ⅛c. higher; pig tin, carloads, 31c.; small lots, 33c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, $7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.50c.; copper bottoms, 10.25c.; copper clips, 10.75c.; red brass, 10.75c.; yellow brass, 7.50c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 26c.; block tin pipe, 29c.

St. Louis

JUNE 15.—Metals slipped off in the week a little, but began to firm up somewhat to-day, and the close was at 3.80c. bid and 3.85c. asked for lead and 4.95c. for spelter, with a firm tone. Tin is easy at 30.95c. to 31.35c.; Lake copper, nominal, electrolytic copper, 14.22½c. to 14.35c.; antimony, dull at 7.60c. to 7.72½c. In the Joplin ore market there was a stronger feeling in zinc blende and in calamine. Zinc blende sold on a basis of $38 to $41 per ton for 60 per cent., while the top settlement for the choicest ore was at $44 per ton. Calamine was firm at $22 to $23 per ton for 40 per cent. metal with the top settlement reaching $27. Lead ore was a little weak at $46 per ton for 80 per cent. We quote miscellaneous scrap metals as follows: Light brass, 5.50c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; zinc, 3c.; lead, 3.25c.; pewter, 23c.; tinfoil, 27c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, June 17, 1914.

Fluctuations have been slight. The almost daily expectation of the railroad rate decision has had little effect on prices. While there is no marked disposition among investors to buy stocks, there is at the same time no evidence of anxiety to sell, though the reiterated determination of the President to put through anti-trust legislation has not helped sentiment. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., pref.	42⅝	Pressed Stl., com.	44 - 44¾
Am. Can, com.	27¾ - 29⅝	Pressed Stl., pref.	102½-102⅝
Am. Can, pref.	93⅛ - 94	Ry. Spring, com.	29 - 29½
Am. Car & Fdy., com.	51¼ - 52	Republic, com.	22⅝ - 23⅞
Am. Car & Fdy., pref.	117¼	Republic, pref.	86⅛ - 89
Am. Loco., com.	32 - 32⅛	Rumely Co., com.	11 - 11½
Am. Loco., pref.	99	Rumely Co., pref.	28¼ - 29¼
Am. Steel Fdries.	31½	Sloss, pref.	86
Bald. Loco., com.	46⅜*	Pipe, com.	9½
Beth. Steel, com.	41¾ - 43	Pipe, pref.	37 - 37⅝
Beth. Steel, pref.	86	U. S. Steel, com.	61¼ - 62⅝
Case (J. I.), pref.	87 - 90	U. S. Steel, pref.	109⅝-109⅞
Colorado Fuel	27½	West'g'hse Elec.	76 - 77
Deere & Co., pref.	94 - 94½	Chic. Pneu. Tool.	53⅞ - 54
General Electric.	148¼-148½	Cambria Steel.	48 - 48¾
Gt. N. Ore Cert.	31¼ - 32¼	Lake Sup. Corp.	15⅝ - 17
Int. Harv., com.	107 -108¼	Pa. Steel, pref.	63½
Int. Harv., pref.	117 -118	Warwick	10
Int. Harv., Corp.	105¾-105⅞	Cruc. Steel, com.	16½ - 16⅝
Int. Harv. Corp., pref.	114½	Cruc. Steel, pref.	93 - 93¾
Int. Pump, com.	5⅛	La Belle Iron, com.	31 - 32

*Ex. dividend.

Dividends Declared

The American Brake Shoe & Foundry Company, regular quarterly, 2 per cent. on the preferred and 1¾ per cent. on the common stock, both payable June 30.

The Sloss-Sheffield Steel & Iron Company, regular quarterly, 1¾ per cent. on the preferred stock, payable July 1.

The J. I. Case Threshing Machine Company, regular quarterly, 1¾ per cent. on the preferred stock, payable July 1.

The Boston Belting Company, regular quarterly, $2 per share, payable July 1.

The Otis Elevator Company, regular quarterly, 1½ per cent. on the preferred stock and 1¼ per cent. on the common stock, both payable July 15.

The United Shoe Machinery Company, regular quarterly, 37½c. per share on the preferred stock and regular quarterly 50c. per share on the common stock, both payable July 6.

The American Iron & Steel Mfg. Company, regular quarterly, 1¼ per cent. on the preferred and common stocks, each payable July 1.

The Canadian General Electric Company, regular quarterly, 1¾ per cent., payable July 1.

The Crucible Steel Company of America, regular quarterly, 1¾ per cent., payable June 30.

The Youngstown Sheet & Tube Company, regular quarterly, 1¾ per cent. on the preferred and 2 per cent. on the common stock, payable July 1.

The Brier Hill Steel Company, regular quarterly, 1¾ per cent., payable July 1.

Officials of the Chicago Pneumatic Tool Company are quoted as saying: "Our sales this year to date are off 10 to 12 per cent., but we have kept ahead of our dividend requirement by a fair margin. June shows some improvement, and if orders continue coming as now we should show dividend doubly earned this year, because second half is much greater with us than first half."

A syndicate headed by Hallgarten & Co. has purchased $3,000,000 one-year 5 per cent. notes of the Bethlehem Steel Corporation. The notes have already been placed with investors. The proceeds will be used for general corporate purposes. The notes were sold on a basis to yield 5½ per cent.

German Steel Trade Full of Problems

Prices Cut Deeply in the Struggle for Business, Due to Large Additions to Capacity—Coal Syndicate Complications

(Special Correspondence)

BERLIN, GERMANY, June 5, 1914.

The Frankfurter Zeitung has recently sent a specialist through the iron and coal districts of western Germany to study their condition; and he has embodied his observations in three extremely interesting articles. A summary and condensation of these will interest readers of *The Iron Age*.

GREAT DROP IN PRICES

If the situation of the iron trade be judged solely according to prices, says the writer, it would have to be pronounced desperate. Where organizations exist, it is true, prices are kept high. Pig iron has just been left unchanged for the September quarter at a relatively high level, although some of the large producers themselves regarded a reduction as necessary. The Steel Works Union pursues a similar policy, with blooms at 87.50, billets 95, and slabs at 97.50 marks. In consequence of these high prices a movement in favor of abolishing the duties has set in, just as in 1908. The precarious position of pure rolling mills, caused by the high prices of semi-finished steel, is not wholly alleviated by the drawbacks granted by the Union, since these drawbacks in some cases do not equal the difference between home and world-market prices; and the weaker producers of finished goods are forced through the drawbacks to work wholly for the foreign markets, although the great mixed works have demoralized the latter still more badly than the home market. Steel bars have been reduced since the end of 1912 from 125 to 92 and 94 marks, or to 80 marks in the Luxemburg-Lorraine district. Luxemburg works have been selling bars for export at prices that leave them only 74 marks (.80c. per lb.) at mills. Gas piping costs now about 150 marks, as compared with 200 marks before the fall began. The correspondent was assured that the present prices of bars hardly cover the mere cost of turning them out at the mills, allowing nothing for interest, depreciation of plant and general expenses.

VOLUME HOLDS UP SURPRISINGLY

The present period of depression differs from previous ones in that the volume of orders has kept up much better. The mills are still running mostly at about their normal rate; but few cases of dismissal of workmen on a large scale have occurred. Production statistics bear witness to this. The make of pig iron continued steadily to increase till the end of 1913, and in the first four months of this year it fell off only 3 per cent. In bar steel, production has continued to increase this year; March showed a record production. Notwithstanding the relatively high production of iron there has been no very great accumulation of stocks at the furnaces. The amount on May 1 was 670,000 tons, or less than two weeks' production.

Where have the supplies of iron been finding a market? The home building trade is in a state of prostration; the shipbuilding industry is calling for smaller amounts of steel than last year; and the great companies are themselves consuming less steel and iron in the extension of their own establishments than last year. It has been chiefly the foreign markets that have been absorbing the large output. The export statistics for January-April show large increases in bars, plates and wire. Increased amounts have been called for by the army and for military defenses; the Prussian railroads have taken more, and harbor and bridge construction has called for large quantities of steel. It is also asserted by persons in the trade that dealers have bought considerable quantities of the cheapest finished products and stored them with the expectation of realizing a good profit later.

NEW CAPACITY A DRAG

While production and sales continue relatively high, still the full capacity of the mills cannot be marketed. The huge new mills of Gelsenkirchen and Thyssen have come into operation precisely at the most inopportune time; and many other companies have also been enlarging the capacity of their mills. Hence there is a real overproduction, notwithstanding the heavy sales of the mills. Although the Pig Iron Syndicate covers only about one-fourth of the production of the country (the other three-fourths representing the iron consumed by the big companies from their own furnaces) its sales are only about 80 per cent. of allotments. The exports of pig iron have been sharply reduced (219,000 tons for January-April against 301,000 tons last year) owing to the low prices prevailing in foreign markets. In spite of the heavy exports of semi-manufactured products the Union's sales of these and of rails and structural steel during the current year will hardly be more than 90 per cent. of allotments. The consumption of beams in particular has been reduced sharply for a year through the prostration of the building trade, and because the low prices of bars tended to encourage the use of reinforced concrete in building. The struggle of the great mixed works to increase their sales in finished lines is very sharp in the case of companies that have insufficient allotments in syndicated products. These works resist the idea of curtailing production, partly on account of the expense of blowing out furnaces, and partly because the furnaces supply them with gas, which is their motive power.

There is nevertheless a certain restriction of production. Sundays are cut out, over-time work has been abolished, and repair operations which had been postponed during the boom are now undertaken. For all that, several big concerns in the Southwest have been putting new furnaces into blast and have begun operations with new rolling mills at a time of waning prosperity—this on the theory that establishments which work under high pressure will succeed best in the long run. The great mixed works no longer haggle over prices on a given order. They argue that they must have a big output in order to reduce general expenses. They will earn money on their coal, even though they lose it on bars. They are carrying forward production to the most finished forms, merely in order to have a market for their coal and pig iron. Hence the wildest price-cutting for the sake of big production.

SYNDICATE TROUBLES MULTIPLY

Turning to the matter of organizations, the writer refers to the recent action of the Rheinische Stahlwerke in giving notice that it would not remain in the Coal Syndicate unless the Steel Works Union were prolonged at the same time for the same period, namely, till March 31, 1921; and unless at the same time trade organizations were formed in the finished material industries for the like period. This denotes a correct conception of the present organization troubles in the west as a struggle between coal and iron. Originally iron works annexed coal mines in order to escape paying the high prices of the syndicate for coal; but later the reverse process set in under the leadership of Gelsenkirchen,—namely, of coal companies annexing iron-works for the purpose of enlarging the market for their coal, and thereby maintaining their predominance in the coal trade.

A number of great amalgamations followed, in some of which iron dominated coal, in others vice versa. In the course of time this state of things caused a complete change in the attitude of the coal mines amalgamated with iron works toward the Coal Syndicate itself. Their primary interest in the Syndicate was no

longer to have at hand the machinery for marketing their coal, but machinery for keeping up high prices on the fuel needed by their competitors in iron and steel, whereas they themselves obtained their coal and coke from their own mines at the mere cost of production. Thus the struggle for coal supplies was intensified by the struggle between the great iron companies with much crude steel to market, and the pure rolling mills and open-hearth steel plants. Iron mills and steel plants without coal supplies of their own succumbed more and more because they had to pay too much for their fuel; and coal companies unattached to iron works succumbed because the circle of their consumers grew ever smaller, in proportion as pure rolling mills were annexed by the great concerns.

THE BATTLE OF THE SYNDICATES

Thus the result of all the big amalgamations of the past decade is that some of the big companies are chiefly interested in coal and treat their iron and steel output to a certain extent as by-products; while others make iron and steel their chief interest and give their coal a secondary place. This conflict of interests was seen for the first time during the negotiations in 1909 for the renewal of the Steel Works Union, when certain great mixed establishments, interested chiefly in coal, suddenly declared that they would take no part in prolonging the Union unless the syndicate were at the same time prolonged for an equal period. The line of thought underlying that declaration was this: If the Union be prolonged and later on the syndicate break down, then a period of low coal prices would follow, iron companies would forthwith annex coal mines as never before; and the result would be that coal would permanently play a secondary role. Now the reverse action has been undertaken by several mixed concerns whose chief interest is in iron and steel. They will withdraw from the syndicate unless the iron trade be completely organized. Better have no coal syndicate than to have the iron industry dominated by coal interests.

ORGANIZE ALL FINISHED LINES, IS THE SLOGAN

Their line of thought is this: If the syndicate be renewed and the iron and steel organizations break down, then the great mixed concerns interested primarily in coal will be able to disturb the peace of the iron trade still worse than hitherto by throwing their finished steel products upon the market at ruinous prices, merely to create a market for their coal. They would earn their dividends almost wholly from coal, and sacrifice profits on steel; and they would be able to sweep the field of all competitors except the very strongest ones. The result would be that steel works of medium class would have to go more and more into the production of the most highly finished products; and they in turn would crush the existing mills devoted solely to producing such goods. Bar mills now turning out a high class of rivet bars and selling them to the manufacturers of rivets and screws would themselves go to manufacturing the latter. If this process should long continue, the smaller mills that turn out high class specialties would be endangered, probably crowded to the wall. The writer says that the business interests thus jeopardized are of much greater economic importance to the country than would be involved in the dissolution of the coal syndicate. It is claimed that from one-fourth to one-third of the workingmen employed in the Rhenish-Westphalian iron trade work in such small or medium-sized concerns that produce finished lines. The Union sells about 1,000,000 tons of steel yearly to this class of home consumers. All the special mills and shops of the Siegerland and adjacent districts,—light plate mills, band mills, wire mills, shops for making screws and rivets, files, plow-shares, and many other specialties—are embraced in the classes of establishments threatened by this movement. That is why some of the concerns have raised this rallying cry: Organizations in finished forms of steel for like periods at the same time that the coal syndicate is prolonged; or let the syndicate and all steel and iron organizations perish together. And that is why a more determined effort is now making than ever before for organizing all branches of the steel trade.

OBITUARY

JOHN DONALD MACKINNON, who founded what is now the MacKinnon Boiler & Machine Company, Bay City, Mich., died June 4. He was continuously in the boiler business from 1866 until the time of his retirement in 1902. He was born in Cape Breton, Nova Scotia, Canada, March 17, 1841. In 1860 and 1861 he was engaged in sailing between New York and the West Indies and in 1863 he sailed on the Great Lakes. In that year he went to Cleveland, to learn the trade of boiler making in the employ of the Cleveland, Columbus & Cincinnati Railroad. In 1866 he was one of the organizers of the Variety Iron Works, Cleveland, but in 1867 he sold out his Cleveland interests and moved to Bay City, where he erected a boiler shop and started in business under the firm name of MacKinnon & Bestor. In 1868 Joseph T. Kirk bought Bestor's interest but in 1869 Mr. Kirk retired from MacKinnon & Kirk, and the business was continued under the name of the Bay City Steam Boiler Works, John D. MacKinnon, proprietor. In 1883 a machine shop, foundry, pattern shop, blacksmith shop and drafting department were added and the name became the MacKinnon Mfg. Company. Mr. MacKinnon served two terms as alderman of Bay City, four years as bridge commissioner, four years on the police commission, and five years on the waterworks commission. In 1902 he sold out his business interests to his sons, Hector D. and Arthur C. MacKinnon, when the title of the concern was changed to MacKinnon Boiler & Machine Company.

JOHN MARTIN FREDERICK, until his retirement four years ago a member of the engineering staff of the Edgar Thomson works of the Carnegie Steel Company, died June 11 at his home in Braddock, Pa., aged 73 years. He was one of the early officials at the first Carnegie plants. He was born in Williamsport, Md., but when quite young the parents removed to Johnstown, Pa. Mr. Frederick learned the iron-making business in the old plant of the Cambria Iron Company, and in 1874, when the late Capt. William R. Jones came to Braddock to build the first plant for Andrew Carnegie, he brought Mr. Frederick with him. Mr. Frederick was given full charge of the finishing mills of the Edgar Thomson works when the plant started in 1875, and he remained in that position until 1885, when he went to the Homestead Steel Works to take charge of the finishing mills there. He was at Homestead eight years and then returned to the Edgar Thomson works and remained there as engineer in the mechanical department until his retirement.

HENRY WALLIS MCMANN, who was regarded as a veteran in the iron pipe and fittings business in New York City, died at his home in Englewood, N. J., Friday, May 29, of a complication of diseases. He was born in the old Greenwich village in New York, September 16, 1846. In 1862 he entered into business with the firm of Norris, King & McMann, which was one of the early and successful houses in the pipe and fittings line, located at 58-60 Gold street, New York. This firm was afterwards changed to McMann & Russell. After the death of Mr. Russell the firm became T. R. McMann & Brother in 1880. Early in 1893 Mr. McMann joined with George W. K. Taylor, the latter formerly of the Eaton, Cole & Burnham Company, New York City, forming the firm of McMann & Taylor. He continued with this firm until 1909, when he retired from active business.

FRANK L. BUSEY, who was engaged in special experimental and research work at Buffalo, N. Y., for the Buffalo Forge Company, died June 7, at the Battle Creek Sanitarium, Battle Creek, Mich., of spinal meningitis. Both in his work at Buffalo and in three or four years preceding that, in connection with the engineering experiment station of the University of Illinois, he added signally to the literature of heating and ventilation, and both the American Society of

Heating and Ventilating Engineers and the American Society of Mechanical Engineers, of which societies he was a member, gained by his contributions. He was born at Urbana, Ill., on August 28, 1872, and was graduated from the University of Illinois.

WILLIAM ALEXANDER MAJOR, one of the pioneers of Birmingham, and for nearly 12 years purchasing agent of the Tennessee Coal, Iron & Railroad Company, died at his family residence at Roebuck Springs, a suburb of Birmingham, early Sunday morning, May 10. He went to Birmingham in 1887, joining the Sloss Company. Several years later he went East with the Empire Steel & Iron Company, but returned to Birmingham in 1901, to become purchasing agent for the Tennessee Coal, Iron & Railroad Company.

WILLIAM HIESTER CLYMER, who for a number of years was superintendent of the Topton and Henry Clay furnaces of the Empire Steel & Iron Company, died at Reading, Pa., June 5, aged 54 years. He had been in ill health for several years. His father was head of the firm of William H. Clymer & Co., which built the Temple furnaces and operated them up to 1870 when the Temple Iron Company was organized. William H. Clymer the younger was a brother of Edward T. Clymer, of Philadelphia.

PERSONAL

F. A. Geier, president, and E. M. Chace, general superintendent, Cincinnati Milling Machine Company, Cincinnati, sailed from New York June 16 on a business trip to Europe.

George H. Gray is now purchasing agent of the Tennessee Coal, Iron & Railroad Company, Brown-Marx Building, Birmingham, Ala., succeeding the late William Alexander Major.

Henry Dreses, president Dreses Machine Tool Company, Cincinnati, sailed from New York June 16 on the steamship Kronprinzessin Cecilie. He will be absent three months on a business trip, including the different industrial centers of Europe.

J. G. Rohrman, formerly of the Pittsburgh office of the Youngstown Sheet & Tube Company, has been placed in charge of a district sales office which the company has opened in Atlanta, Ga., in the Healey Building.

J. L. Bender, recently sales manager of the Grant-Lees Gear Company, Cleveland, is now in charge of the sales of the Yuster Axle Company, Cleveland. He has the benefit of a long training in the organizations of the American Ball Bearing Company and the Timken Roller Bearing Company.

A. H. Teuchter, president Cincinnati Bickford Tool Company, Oakley-Cincinnati, Ohio, sailed June 16 for Europe, and will make a business tour of several weeks.

Buckner Wallingford, of the Walter-Wallingford Company, Cincinnati, has gone on a combined business and pleasure trip to Europe. He is accompanied by his family.

E. E. Slick, vice-president and general manager of the Cambria Steel Company, Johnstown, Pa., has been made a director of that company and also of the Pennsylvania Steel Company, Steelton, Pa.

Ernst Birkholz, of the engineering firm of Salau & Birkholz, Essen, Germany, is in the United States in connection with the introduction of the Walther annealing oven and the Birkholz burner for blast furnace and coke oven gas.

A. G. Baker, Wm. McConway, Geo. M. Verity and Paul M. Warburg, were re-elected directors and John R. McCune, H. N. Westinghouse, Paul D. Cravath and Jas. N. Wallace were elected to fill vacancies at the annual meeting of the Westinghouse Electric & Mfg. Company.

E. C. Sattley, of the Page Woven Wire Fence Company, Monessen, Pa., whose term as president of the Traffic Club of Pittsburgh recently expired, was presented with a gold watch by the board of governors of the club, acting for the entire membership.

Fred A. Poor resigned June 1 as Chicago representative of the Rail Joint Company to become president of the P. & M. Company, manufacturer of anti-creepers, with offices in the Railway Exchange Building, Chicago.

F. E. Hulett, of the Wellman-Seaver-Morgan Company, Cleveland, Ohio, sailed last week for Europe and will spend several weeks in England, France and other countries.

Morris Bush, former furnace manager of the Woodward Iron Company, has been chosen president of the Shelby Iron Company, which operates two charcoal iron furnaces in Shelby County, Ala. He succeeds Ward W. Jacobs, of Hartford, Conn., who has been president since the death of the late T. G. Bush, father of Morris Bush.

The Cleveland Engineering Society, Cleveland, Ohio, has elected Elliott H. Whitlock as president for the ensuing year and W. B. Hanlon as vice-president. J. H. Stratton, of the Wellman-Seaver-Morgan Company, was elected a director and E. B. Thomas and F. H. Vose were re-elected directors. The secretary and treasurer will be elected June 30. The thirty-fourth annual meeting and banquet of the society was held at the University Club, June 9. Charles Whiting Baker, editor-in-chief of the Engineering News, was a guest of honor and the principal speaker. His topic was "Ethics for Engineers."

Pierce G. Smith has been appointed manager of a branch which the E. J. Woodison Company, Detroit, fire brick, foundry requisites, etc., has opened at 378 Ellicott Square Building, Buffalo, N. Y.

Charles A. Cahill, of the Thos. S. Watson Company, Milwaukee, was elected president of the Engineers' Society of Milwaukee at the annual meeting on June 10. Arthur Simon, Cutler-Hammer Mfg. Company, was elected vice-president; Frederick H. Dorner, secretary, and M. A. Beck, treasurer. As the feature of the session, Mr. Simon, the new vice-president, gave a lecture on European industrial works, illustrated with stereopticon views. Mr. Simon recently spent several months in Europe on a tour of inspection.

John D. Hallowell has been appointed general manager of the Mitchell Wagon Company, Racine, Wis., which was organized recently to take over the entire wagon and vehicle business of the Mitchell-Lewis Motor Company, Racine. Mr. Hallowell has been manager of the Moline Wagon Company, Moline, Ill.; the Winona Wagon Company, Winona, Minn., and for some time was associated with the John Deere Plow Company, Moline.

L. L. Tatum, Cutler-Hammer Mfg. Company, Milwaukee, was elected chairman of the Milwaukee section of the American Institute of Electrical Engineers.

The selection of new officers for the Scully Steel & Iron Company, following the death of Mr. Scully, has resulted in the choice of Chas. Heggie, president; Geo. Mason, Jr., vice-president, in charge of sales, and G. H. Avery, vice-president, in charge of credits. Mr. Heggie has been associated with the Scully company for many years and is very well known in Western iron and steel circles.

W. L. Hoffman has been elected resident manager of the Philadelphia office of Hickman, Williams & Co., which in the future will be under the jurisdiction of the Pittsburgh office.

The proposed freight tariffs for wasting or hauling away mill and furnace slag in the Pittsburgh district, which were to become effective July 1, have been postponed until August 1. This action was taken several days ago at a conference between the railroads and the shippers held in Pittsburgh.

The Supply Men's Annual Convention

Dealers and Manufacturers of Machinery and Mill Supplies Discuss Problems on Monday at White Sulphur Springs, W. Va.

The conventions of the American Supply and Machinery Manufacturers' Association and the National Supply and Machinery Dealers' Association opened at the Greenbrier Hotel, White Sulphur Springs, W. Va., Monday, June 15, with a joint session of the two associations. At the last moment plans were changed, to combine the morning and afternoon sessions of the first day which gave the golf players among the delegates more time for a tournament which had been arranged and for which several prizes were offered. The donors were Kirk-Latty Mfg. Company, Cleveland, Ohio; Dodge Mfg. Company, Mishawaka, Ind.; Charles Parker Company, Meriden, Conn.; George T. McIntosh, Cleveland, Ohio; E. C. Atkins & Co., Indianapolis, Ind.; and the Manufacturers' and Dealers' Golf Association.

FIRST SESSION A JOINT MEETING

The meeting was called to order by President D. K. Swartwout, Ohio Blower Company, Cleveland, Ohio, who after a few words of greeting introduced Charles S. Farquhar, Chandler & Farquhar, Boston, Mass., president of the National Supply and Machinery Manufacturers' Association. Other speakers, all of whom spoke in a felicitous vein, were Alvin M. Smith, secretary of the Southern Supply and Machinery Dealers' Association; Major W. H. Banks, Banks Supply Company, Huntington, W. Va.; John Trix, American Injector Company, Detroit; T. James Fernley, advisory secretary-treasurer of the National Association; George Puchta, Queen City Supply Company, Cincinnati, and Edward C. Hinman, American Steam Pump Company, Battle Creek, Mich.

Mr. Trix in a good-natured way took exception to a remark made by Mr. Smith to the effect that politics should be eliminated from the meetings. Mr. Trix said the members should get into politics up to their ears. "It is politics that does things for us and it is politics that is doing things to us now." he said, "but we must be Americans first and partisans afterward. The mistake we make is in being carried away by party politics." He went on to relate some of his observations while in Germany last summer with the American Society of Mechanical Engineers. He mentioned some of the many political parties that exist in Germany but said that with all of them it was "the Vaterland first." He said the American people should view with shame the fact that it has no merchant marine to use the Panama Canal, nor to carry on trade with South American countries. When he went abroad the German steamship company which furnished his transportation had 36 ships in the South American trade.

In pointing out the dangers of foreign competition, Mr. Trix said that in February last he had seen pig iron unloaded in San Francisco at prices which were far under those of domestic makers, while he knew also of foreign structural steel having been landed in Seattle. Another case which came to his personal attention was the buying of a German shear by a Detroit automobile maker who thereby saved $600. Incidentally he remarked that Secretary Redfield of the Department of Commerce was first-class theoretically, but not nearly so impressive in a practical way.

CONCRETE CASES OF GERMAN COMPETITION

The speaker then related instances where German manufacturers were able to undersell American products in which Mr. Redfield had once been interested. He referred also to a firm making presses used by silk manufacturers who lost a sale because German makers were able to deliver their machines in Passaic, N. J., at prices which Americans could not meet. As another illustration he specified a case where three agricultural traction engines of German make had been bought after several American makers had been underbid, with the understanding that others would be bought if the try-out proved satisfactory.

Mr. Trix referred to seeing one man running four milling machines in Germany, while another man operated six screw machines.

He wished that Americans could acquire the habit of thinking, as Germans have. The sale of spirituous liquors has declined greatly in Germany, Mr. Trix said, and for one reason because of their habit of thinking. The Germans realize that they must compete with the world, that to get and keep trade they must have efficient mechanics and that alcoholic drink was not good for the mechanics. Their practice once was to consume large quantities of beer in working hours, but the thinking employer had substituted tea of the best quality that money could buy. This beverage was furnished at a nominal price with sugar free and in generous quantity, with the result that periods of dullness and low efficiency were eliminated.

Mr. Hinman spoke of the value of conventions in extending acquaintanceship. The man who did business by letter was likely to get an idea that he was the only honest man in his line, while by mingling with others at conventions he soon learned that there was some honesty in all.

Mr. Swartwout read a telegram from W. M. Pattison, W. M. Pattison Supply Company, Cleveland, expressing regret at being unable to attend the convention.

DISCUSSION ON ONE-CENT LETTER POSTAGE

William H. Taylor, president David Williams Company and publisher of *The Iron Age*, and George T. McIntosh, National One-Cent Letter Postage Association, Cleveland, then made addresses on the subject of 1-cent letter postage. Mr. Taylor, speaking from the viewpoint of the publisher of trade papers, pointed out that these papers in the aggregate amount to less than 4 per cent. of the matter entitled to second-class postage. He began his address by saying:

I want first to explain that I have no quarrel with the so-called 1-cent postage proposal. The American people are entitled to and should have 1-cent postage if they want it, provided, of course, they are willing to pay the price. They gave free rural delivery to our country cousins, for which they pay $38,000,000. They gave franking privileges to our national officials and free delivery within counties. We are a rich and liberal nation and if we want 1-cent postage we will have it. But do we want it, or should we have it at the expense

of something far more valuable than cheap postage—something, the taking away of which would retard the growth of this country, both intellectually and industrially? I refer to the splendid reading matter found in periodicals such as magazines, trade and daily papers now mailed at second-class rates.

Mr. McIntosh said that his association had not singled out trade papers for attack to the exclusion of other magazines and periodicals, but that objection was directed mainly at the vast number of small and irresponsible publications, many of which sprang up almost over night. He believed that the objections of publishers could be overcome. Both speakers were heartily applauded and given a rising vote of thanks on motion of Willard Parker, Pennsylvania Shafting Company, Spring City, Pa.

Supply Dealers' Afternoon Meeting

The National Association held its first session in the afternoon, and first heard the annual address of President Farquhar, who said in part:

During the past 12 months there has existed a period of uncertainty in business which has not contributed largely to the profits of the members of this association. We are beginning to hear reports which indicate the approach of better times and already some of those in the business report that their sales are increasing and that while they cannot feel justified in any great degree of enthusiasm, they feel convinced from actual sales that conditions are improving.

We are inclined to the opinion that the work of an association of middlemen must very largely be of an educational character. There is, in the city in which I live, a very important work being carried on with respect to the cost of distribution of goods. This work is being done by the Graduate School of Business Administration of Harvard University. The founders of this special research work have declared that the cost of manufacture and production has been accurately ascertained by methods which are thoroughly scientific both in theory and practice. They point to the fact, however, that the important factor of the price the consumer pays—the cost of distribution, has not been covered by any accurate investigation which would prove the facts with scientific accuracy and which would lead to a knowledge of the correct cost of efficient distribution.

This Bureau of Research has recently become interested in the hardware and supply line. I recently had a call from one of their representatives in relation to this work and went into details to a considerable extent in regard to our own business. Reports show that they have obtained data from 37 hardware and supply stores in Boston, Somerville and Cambridge.

QUESTION OF RESALE PRICE MAINTENANCE

The resale price movement received a severe setback a year and a half ago when the Supreme Court decided that the manufacturer of patented or unpatented goods had no right to dictate the price at which the wholesaler or retailer should sell them. Since then, there has been considerable information spread broadcast concerning the propriety and reasonableness of the resale price system, and it has been fairly demonstrated to the public that the establishment of resale prices by the manufacturer does not mean an average higher price, but merely means that the price shall be uniform at all times and in all places. This subject has been considered in a good many ways and many of our friends at Washington have come to realize that the resale price does not make the average higher price, but gives the man with a small shop and limited capital a fair chance as against the large buyer with an A-1 rating.

I wish to call your attention to the Clayton bill, now in Congress, which is said to embody the views of the administration in regard to trusts and the action of business men. One of its provisions which strikes at the supply business is the intended prohibition of exclusive agency arrangements. There are members of our association who would not and could not afford to interest themselves in goods if they did not control the goods in their territory. It is said that this bill probably will become law without any material change, but I believe that when it is proved to the administration that no injustice is done any legitimate interest by the maintenance of exclusive agencies, that they will make the necessary changes in the present plan of the bill.

Mr. Farquhar paid a tribute to Henry Prentiss, Prentiss Tool & Supply Company, New York, who as vice-president of the association has charge of the machine tool section. Mr. Prentiss is now in Europe. Mr. Farquhar said: "Mr. Prentiss is held in great esteem and respect by all the machine tool trade both among the manufacturers as well as the dealers, and to him must be given a great measure of the credit for the pleasant relations which exist between this organization and the National Machine Tool Builders' Association."

Mr. Farquhar referred feelingly to the recent death of J. O. Harron, Harron, Richard & McCone, San Francisco.

The next business considered was the report of the special committee on the cost of distributing mill supplies with a view to determining the degree of efficiency attained by dealers in mill supplies and kindred lines. This report was read by F. B. Davenport, Frick & Lindsay Company, Pittsburgh, on behalf of W. E. Frick, chairman of the committee, who was unavoidably absent. It was discussed by a number of the members, including W. L. Rodgers, Pittsburgh Gage & Supply Company; George Vonnegut, Vonnegut Hardware Company, Indianapolis; E. B. Hunn, C. S. Mersick Company, New Haven, Conn., and George Puchta, of the Queen City Supply Company, Cincinnati. In part, the report was as follows:

JOBBER FOUND NECESSARY IN DISTRIBUTION

From our investigation it is so apparent the jobber is absolutely essential in the distribution of our particular line and it is so evident to the many manufacturers and jobbers alike, that it seems unnecessary to bring out in this report such well known facts and figures.

While we are considering especially the mill and mine supply business, our investigation shows that many trades have like conditions and obtain the same results. A manufacturer determines he will trade direct with the consumer and avoid the middleman with the view that he will have a broader field and avoid the intermediate profit, but he forgets that he can only be as efficient as the jobber when he gives the same service, and to give this same service, he must either establish branch houses or sell his product at a much lower price than the jobber's prices as a special inducement to overcome the jobber's service; likewise, the consumer, who seeks the manufacturer usually develops an extensive purchasing department directed to avoid the jobber's profit, failing to consider the expense of this extensive purchasing department and the necessary investment in a large stock of supplies. A cost expert could easily show to such concerns that they could really make a saving by dealing with several nearby jobbers; he could show them that they carry unnecessarily large stocks, considerable of which deteriorates and is wasted, and can also show the expense of the extra clerk hire and accounting. The most potent reasons that can be offered to prove the jobber is necessary to the efficient and economical distribution in our line is the failure in other lines, where the opportunities were better, to accomplish either efficiency or saving.

Mail order houses on a cash selling basis have an average of 27 per cent. cost for doing business, while the jobbers' and retailers' combined costs in the many lines they handle average only 22 per cent.; there is no question the local retailer can give the better service.

When a manufacturer establishes branch houses many examples prove that the operating cost has been

excessive and unprofitable. If a manufacturer sells direct through these branches, he simply has the corresponding expenses of a jobber in additional stock, rent, insurance, selling, shipping and accounting expenses. Jobbers keep their salesmen traveling over a small territory, and these, with the varied products and the numerous orders, make their pay, but a manufacturer with only one article to sell could go over the same territory at the same expense and make the cost on his one product excessive.

MISCELLANEOUS QUESTIONS DISCUSSED

There followed a discussion on the matter of the cost of handling orders and of the advantages of figuring the cost on all goods sold so that at all times the members of the association would know how much profit or loss was being made on the sales which were being effected by their salesmen and on orders which were received by mail.

Discussion also took place concerning the increasing volume of goods which were returned for one reason or another and recommendations made with a view to decreasing such items of returned goods. Attention was also called to the matter of concealed losses or items which might be termed "hidden expense." Hidden expense was defined as damage to goods which were returned and to petty stealings, as well as other amounts which are seldom reported on books of record.

Members of the association expressed their desire to continue the cost committee so that cost investigation might become a permanent factor in the work of the organization.

J. C. Miller, Miller Supply Company, Huntington, W. Va., called attention to the excessive number of changes in the list prices on manufactured products in the mill supply line which proved to be both annoying and expensive to all dealers who issued catalogues.

President Farquhar next announced the appointment of the nominating committee as follows:

Crannel Morgan, Hardware & Supply Company, Akron, Ohio; W. A. Ridings, Syracuse Supply Company, Syracuse, N. Y.; Ernest L. Davis, S. H. Davis Company, Boston; George Puchta, Queen City Supply Company, Cincinnati; Thorval L. Ryerson, W. D. Allen Mfg. Company, Chicago; F. B. Davenport, Frick & Lindsay Company, Pittsburgh; B. M. Scott, Duncan & Goodell Company, Worcester, Mass.

In part, the report of Secretary-Treasurer Thomas A. Fernley was as follows:

HOW THE ASSOCIATION HELPS MEMBERS

It has been the pleasure of the secretary to send to the members from time to time a list of the overstock which has been held by the various members of the association and by this information regarding overstock, the members have been relieved of a stock of goods which has not sold with them but which is selling actively with their competitors.

The methods of association work have changed considerably in the last four or five years but organization among the dealers is felt to be necessary to a continuance of their successful existence. There is a spirit of unrest regarding the middleman which demands attention and it is our conviction that that attention can best be paid by a full and ample demonstration of the economy of the services performed by the middleman or supply dealer.

If we can truthfully and thoroughly demonstrate to any doubters the fact that goods handled through the dealer will cost less than if the factory attempts to maintain direct relations—we can do much toward making the supply business more pleasant, more satisfactory and eventually more profitable, for at the same time we educate the general public to the truth of the value of the services performed by the dealer.

Pittsburgh and Nearby Districts

The Youngstown Iron & Steel Company, which will build an open-hearth steel plant at Youngstown, Ohio, to make its own sheet bars, recently authorized an increase of $800,000 in its preferred stock and $1,200,000 in the common stock. Of the increase of $800,000 in the preferred stock, $600,000 was offered for sale and this has been largely oversubscribed.

The real estate and personal property of the Leetonia Steel Company, Leetonia, Ohio, will be offered for public sale by the receiver, Wm. H. Hepburn, Lisbon, Ohio, authority for the sale having been given by the court. The court stipulated that the property be sold for an amount sufficient to pay the liens and expenses of the receivership.

The McClure-Johnston Company, iron, steel and tin plate, Pittsburgh, has been incorporated with a capital of $10,000. W. J. McClure, Pittsburgh, is treasurer.

The New Castle Steel & Iron Company, New Castle, Pa., has increased its capital stock from $400,000 to $550,000.

The Youngstown Sheet & Tube Company and the Carnegie Steel Company arranged to receive at Youngstown last week the safety and sobriety exhibit recently shown at the Grand Central Palace, New York City. The exhibit, in charge of Miss Edith Wills, of Boston, was open to the mill men employed by these two companies in Youngstown, June 13-15, and was shown to the men for the purpose of educating them in the use of safety appliances.

The new plant of the Ford Motor Company to be erected in the East End, Pittsburgh, will be unique in many ways. At present an eight-story building with basement and two sub-basements is being erected, and will cover an area of 140 x 245 ft. The building will be faced with brick and terra cotta. One-third of the first floor will be offices and the remainder a garage. There will be two freight elevators, one of which will ascend to the roof to convey autos to the roof proving trial course, where all cars are to be tried out. The course will be safeguarded with a strong rail. The grounds around the building are to be parked with lawn and flower beds. This will be an auto assembling plant, and when necessary three more stories may be added to the building.

W. Harry Brown, owner of the Alicia mines and coke oven plant in the Connellsville region, states that reports that $500,000 would be spent on this plant and the number of ovens increased from 400 to 850 are incorrect. Only minor improvements are being made at this plant, and there will be no increase in the number of ovens at present.

The Mesta Machine Company has received an order from the Massillon Rolling Mill Company, Massillon, Ohio, for a 34-in. two-high reversing blooming mill and equipment including tables, manipulator, shear, etc. The mill will be made of cast steel and when completed will be one of the most modern in the United States. The contract also calls for a large rope drive to be used in connection with the new 24-in. sheet bar mill, now being built by the company. The Cambria Steel Company has placed an order for four horizontal cross compound blowing engines with high-pressure steam cylinders 48 in. in diameter, low-pressure steam cylinders 84 in. in diameter and air cylinders 84 in. in diameter with a 60-in. stroke. They will be equipped with Mesta automatic plate valves, Iversen patent, and will be duplicates of those recently furnished for the Woodward Iron Company in record time. Orders for 10 of these engines have been received within the past seven months, in addition to orders for 26 new air heads equipped with automatic plate valves to replace heads on existing blowing engines of various makes. On Saturday, June 13, a slight fire occurred at the West Homestead plant, but it was confined to two pattern storage buildings at one end of the plant, and will not interfere in any way with operations or in prompt shipment of orders. The loss was not over $25,000, fully covered by insurance.

THE WESTINGHOUSE STRIKE

Plain Statement of the Companies' Position — A Small Minority of Union Men

The only important development in connection with the strike which started on June 5 at the plants of the Westinghouse Electric & Mfg. Company, the Westinghouse Machine Company and Pittsburgh Meter Company, all at East Pittsburgh, Pa., was that late last week it extended to the plant of the Union Switch & Signal Company at Swissvale, Pa., a large number of the men employed at this plant having walked out. On Monday, June 15, the four companies named issued a statement, in which the principles to which the Westinghouse companies stand committed were set forth as follows:

1. *Westinghouse shops shall be open shops.*—We stand for the principle of an open shop in which union and non-union men may work without molestation or being forced to join any organization.

2. *Westinghouse employees may or may not be members of any organization.*—We do not require of our employees that they shall refrain from joining labor organizations any more than we attempt to restrain them from joining any other bodies, but we maintain for all our employees the right to refrain from joining any organization without prejudice to their positions or their security or their comfort in our employ.

3. *The pay of skillful and productive Westinghouse employees shall not be regulated by the pay of the inefficient and less productive.*—We pay wages and maintain shop conditions which compare favorably with other manufacturers in our industries. By this means and by the added inducement of steady employment we endeavor to attract the best workmen. In order to compete with other firms, both at home and abroad, we must introduce all of the agencies by which the best efficiency is obtained. We reserve the right to determine the compensation of our employees on the basis of the service they perform for us as well as by the day rate which measures only the time spent in our works.

4. *Every Westinghouse employee has the right of conference with the management.*—We receive any one employee or any number of employees from any department, or any properly chosen committee whose selection shall be truly representative from any department or of the whole body of our employees.

5. *Every Westinghouse shop shall be safe, sanitary and comfortable, and all suggestions of employees for improvement in shop conditions are welcomed by the management.*—We seek to maintain the best standard of sanitary and working conditions in our factories as we believe that to provide as good surroundings as the character of our operations permit is the best guarantee we have of obtaining and holding the best class of employees.

As opposed to the principles advocated by the Allegheny Congenial Industrial Union—

We assert that the interests of the employee and the employer are identical and that there can be no success for either party unless each recognizes the necessities of the other.

We deny that employers and employees can never see things from a common viewpoint, and assert that the success of any business undertaking is dependent upon each endeavoring to view their common interests from the same viewpoint.

We assert that in seeking for concessions neither party should attempt to obtain them either by force or compulsion.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY,
WESTINGHOUSE MACHINE COMPANY,
UNION SWITCH & SIGNAL COMPANY,
PITTSBURGH METER COMPANY.

The principal demands of the strikers are the elimination of the piece, premium and bonus systems, also the reinstatement of all men laid off or discharged since February 1, 1914. This last demand is regarded by the company as absurd, as none of the companies has enough work to employ all the men that were laid off for lack of orders since February 1. In regard to the premium, bonus and piece work systems, an official of the Westinghouse companies states that these are all in force and have been for years in the plants of their leading competitors, including the General Electric Company and the Western Electric Company. Under no circumstances will the Westinghouse interests agree to do away with these systems, as they have proven very satisfactory, not only to the companies but also to the men. The earnings of the latter have been large and the companies believe in rewarding skilled men by paying them a higher wage.

No conferences have been held between the strikers and the Westinghouse companies, the nearest approach to this being that last week a committee called on E. M. Herr, vice-president of the Westinghouse Electric & Mfg. Company. As this committee represented the Allegheny Congenial Industrial Union, Mr. Herr declined promptly to treat with it, but stated he was ready at any time to confer with employees who would come to him as such. It can be said now that none of the Westinghouse companies will recognize labor unions, but as set forth above none of the companies has any objection to a man or woman belonging to a labor union, providing such employee observes the rules in force in the shops of the Westinghouse companies.

Indications are there will be important developments this week in this strike, which is the first the Westinghouse interests have had since 1892. It is believed these developments may possibly result in a settlement of the trouble, as not more than 10 per cent. of the employees of the Westinghouse companies belong to the Allegheny Congenial Industrial Union, and most of the men quit work through sympathy. Many have returned to their jobs in the last three or four days.

A spirit of optimism prevails among the officers of the various Westinghouse companies in regard to the strike and there is a feeling prevalent that in a short time there will be a general movement to return to work on the part of a majority of their men. When asked as to the effect of the strike on the business of the companies, one of the officers stated that owing to the policy adopted several months ago of manufacturing goods for stock in order to provide work for its employees during the dull period, a large amount of goods, sufficient in many lines for several months' requirements, had been made and distributed to the company's warehouses in various parts of the country, from which orders have been filled daily without delay.

Barrows Mine Abandoned

M. A. Hanna & Co. have abandoned their Barrows mine on the Cuyuna range. They have an ample supply of similar high phosphorus ore in their Ravenna and Carpenter mines in the Crystal Falls district. The first shipments from the Barrows mine were made in 1913, amounting to 9,089 tons. Since last season 47,000 tons of ore have been taken from this mine, the shipment of which has just been finished. The mine equipment is now being removed.

M. A. Hanna & Co. will shortly begin shipments from the open pit of their Wakefield mine in the Gogebic range. They made their first shipments from the underground operations of the Wakefield late last season, amounting to only two cargoes. Further shipments of ore mined underground are being made this season.

Stockholders of the Meehan Boiler & Construction Company, Lowellville, Ohio, will meet July 9 to vote on a proposed increase in capital stock from $25,000 to $50,000. If the increase is authorized it is probable this company will make some extensive improvements.

The National Roll & Foundry Company, Avonmore, Pa., has a contract for building a sheet bar mill in the new open-hearth steel plant of the Massillon Rolling Mill Company, Massillon, Ohio.

RAILROAD MEN SEE MACHINERY

Atlantic City Exhibit Interests Master Mechanics, Car Builders and Manufacturers

The exhibit of machine tools and railroad supplies and equipment conducted by the Railway Supply Manufacturers' Association at Atlantic City, June 10-17, in connection with the conventions of the American Railway Master Mechanics' Association and the Master Car Builders' Association was equal to and in some respects superior to those of previous years. The space occupied on the steel pier, where innumerable products are displayed each year, approximated 82,000 sq. ft. Some old-time exhibitors were missed, but it was found that their places had been taken by new ones. The master mechanics, who naturally were most interested in the metal-working machines, held their session in the last half of the convention week, though many of them arrived in advance and devoted much time to the exhibits.

The showing of machine tools in operation at these conventions has come to be regarded as of great importance outside of railroad circles, as well as within them, for the reason that it affords manufacturers and others an opportunity not only to see in actual operation the machines which salesmen are constantly asking them to buy, but they are enabled to gather suggestions for the improvement of production in their shops with the equipment they have. Some of the tools displayed never return to the factories or warerooms they were shipped from, as they are sold on the exhibition floor. In other cases sales have been made directly traceable to the exhibition. About 50 firms were new exhibitors at this year's show and the tonnage of machine tools displayed was estimated to exceed that of last year by about 10 per cent.

The arrangements for the two conventions and the entertainment of the several thousand delegates were carried out on the usual big and impressive scale. The Railway Age Gazette, New York, issued daily editions containing complete detailed reports of the proceedings and events of the conventions.

Among the exhibitors were the following:

Acme Machine Tool Company, Cincinnati, O.—Demonstrating exhibit on Cincinnati Acme 3¼ x 36-in. flat turret lathe; bar work being made to blue print; Cincinnati Acme 18-in. geared head universal turret lathe.

Alston Saw & Steel Company, Folcroft, Pa.—Alston new process hack saw blades demonstrated in power hack saw machines.

American Brass Company, Ansonia, Conn.—Extruded and die-pressed metals, sheet wire, rod and tubing in non-ferrous alloys, copper commutator and bus bars.

American Car and Foundry Company, New York, N. Y.—Cast iron chilled wheels.

American Flexible Bolt Company, Pittsburgh, Pa.—American staybolts.

American Locomotive Company, New York, N. Y.—Reception booth.

American Steel Foundries, Chicago, Ill.—The Vulcan truck; Andrews side frames; cast steel bolsters; Simplex bolsters; Simplex couplers; American coupler pocket; Economy draft arms; Davis cast steel wheels; brake beams; springs; Susemihl roller side bearings; miscellaneous steel castings.

American Tool Works Company, Cincinnati, Ohio.—One 36-in. heavy pattern "American" high duty lathe; one 16-in. high duty tool room lathe; one 6-in. heavy duty radial drill; one 2-in. radial drill; one 24-in. heavy service crank shaper.

Armstrong-Blum Mfg. Company, Chicago, Ill.—Marvel high speed sawing machines.

Armstrong Cork & Insulation Company, Pittsburgh, Pa.—Nonpareil insulating brick; high pressure covering; boiler lagging; cork car insulation; cork pipe covering for drinking water systems; cork machinery insulation.

Ashton Valve Company, Boston, Mass.—Locomotive muffled and open pop safety valves; steam and air gauges; wheel press recording gauges; locomotive chime whistles; air brake recording gauges; weight gauge testers; piston swabs; blow-off cocks.

Baker Brothers, Toledo, Ohio.—One Baker high speed heavy duty drill.

Baush Machine Tool Company, Springfield, Mass.—New design Lassiter staybolt turning and threading machine; automatic staybolt drilling machine; new design 5-ft. radial drill.

Besly & Company, Chicago, Ill.—One Number 15-19-C Besly pattern makers' disc grinder; one Number 51-26-L motor driven disc grinder; Helmet spiral circles; temper taps; oil; Helmet pressed steel ring wheel chucks.

Boker & Company, Hermann, New York, N. Y.—Nickel clad sheets for car trimmings.—Novo and Novo superior high speed steels; special alloy steels.

Bowser & Company, Inc., S. F., Fort Wayne, Ind.—Gasolene and oil storage systems, consisting of long distance and first floor self-measuring pump and storage tanks. Red sentry enclosed long distance pumps with electric lamp attachment. Complete oil filtration system. Self-registering pipe line measure.

Brown Automatic Hose Coupling Company, Toledo, Ohio.—Brown automatic hose coupler; Brown open port air hose coupler.

Browning Company, Cleveland, Ohio.—Railway ditchers.

Brubaker & Brothers, W. L., Millersburg, Pa.—Taps; dies, reamers; screw plates; special tools for railroad work.

Buchanan Electric Steel Company, Buchanan, Mich.—Electric furnace castings, consisting of thin walled and other intricate castings made possible by the use of electric furnaces for melting and refining.

Buckeye Steel Castings Company, Columbus, Ohio.—Cast steel car bolsters; truck frames; car trucks; journal boxes; car couplers and coupler yokes.

C. & C. Electric & Mfg. Company, Garwood, N. J.—Electric arc welding outfit in operation; samples of various kinds of welding done with C. & C. apparatus; panels containing patented system of automatic control; samples of locomotive flue welding.

Carborundum Company, Niagara Falls, N. Y.—Carborundum and aloxite.

Carnegie Steel Company, Pittsburgh, Pa.—Steel railway ties; Duquesne joints; Braddock insulated joints; rolled steel locomotive piston head; rolled steel passenger and freight car wheels; rolled steel gear blanks and gears; concrete reinforcement bars; electric and electric alloy steels; screw spikes and track bolts; lantern slide photographs of manufacturing processes.

Celfor Tool Company, Buchanan, Mich.—Celfor drills, reamers, flue cutters, countersinks, chucks, sockets, tool holders and tool bits.

Chicago Pneumatic Tool Company, Chicago, Ill.—Chicago Pneumatic air compressors; Little Giant drills; Boyer hammers; Boyer rivet busters; Boyer speed recorders.

Chisholm & Moore Mfg. Company, Cleveland, Ohio.—Cyclone chain hoists from ½ to 40-ton capacity, which are largest single units made; standard screw hoists; matchless trolley, both plain and geared; extended hand wheel shaft hoists; mounted models showing internal workings.

Cincinnati Bickford Tool Company, Cincinnati, Ohio—One 24-in. shaft driven, high speed upright drill fitted with patent geared tapping attachment, motor and speed box drive. One 5-in. Cincinnati Bickford plain radial drill fitted with cooling equipment, motor and speed box drive.

Cincinnati Milling Machine Company, Cincinnati, Ohio.—No. 5 plain high power motor driven miller equipped with stream lubrication; No. 2 high power vertical miller motor driven; No. 1½ cutter and tool grinder.

Cincinnati Planer Company, Cincinnati, Ohio.—One 36 x 36-in. x 8-ft. heavy pattern planer, with four heads and reversible motor drive.

Clark Foundry Company, Rumford, Maine.—Combined punch and shear.

Cooper Hewitt Electric Company, Hoboken, N. J.—Cooper Hewitt electric lamps; quartz lamps; rectifiers for these lamps.

Crane Company, Chicago, Ill.—Locomotive pop safety valves; locomotive blow-off valves; locomotive ash-pan blower valves; locomotive car hose sprinkler valves; locomotive globe and angle valves; brass to iron seat railroad unions; brass to iron seat railroad union ells and tees; pump stud unions; special tested air brake fittings; steel valves and fittings; Cranetilt steam traps; Crane-Erwood non-return emergency valves; standard malleable and cast-iron fittings and full line of valves and fittings for equipping power plants complete.

Davis Boring Tool Company, St. Louis, Mo.—Car wheel boring tools and a general line of machine shop boring tools and reamers.

Dearborn Chemical Company, Chicago, Ill.—Dearborn water treatment for use in locomotive and stationary boilers

for the prevention of foaming, corrosion, pitting and scale formation. Waters analyzed and treatment prepared to suit the conditions found.

Deforest Sheet & Tinplate Company, Niles, Ohio.—Metal roofing, Lohmannized products, T and T metal posts; T and T culverts.

Detroit Lubricator Company, Detroit, Mich.—No. 22 series of bullseye locomotive lubricators; air cylinder lubricator; emergency valves; air brake lubricator; boiler valves; electrically operated flange lubricator exhibit complete; improved standard lubricator; "500" air compressor lubricator; sectional force feed oiler with cut-away tank packless and multiport valves; transfer filler.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Dixon's graphite products, including silica-graphite paint; Ticonderoga flake graphite; graphite greases, graphite brake cylinder grease; boiler graphite; shop supplies, such as belt dressing, pipe joint compound, cup greases, etc., also pencils and crucibles.

Duff Mfg. Company, Pittsburgh, Pa.—Barrett track and automatic lowering jacks; Duff high speed ball bearing jack with cyclone lowering device; Duff-Bethlehem forged steel hydraulic jacks; traversing bases; car emergency jacks.

Earle Gear & Machine Company, Philadelphia, Pa.—One No. 15 Lea simplex cold saw with side drive; one No. 21 Lea simplex cold saw motor driven with inserted tooth blade; one automatic revolving jaw chuck; one double suction Lea high duty volute pump.

Edison Storage Battery Company, Orange, N. J.—Edison storage batteries for train lighting, railway signals, baggage, freight and mail trucks, multiple unit control, electric incandescent headlights, inspection lamps, etc.

Electric Controller & Mfg. Company, New York, N. Y.—Lifting magnet handling scrap iron, etc.; automatic machine tool controllers; automatic motor starters with push button control; push button operated wheel lathe controller; reversing motor planer controller; crane controllers.

Elwell-Parker Electric Company, New York, N. Y.—Electric storage battery industrial, freight and baggage trucks; service recorder.

Fort Pitt Malleable Iron Company, Pittsburgh, Pa.—Reception booth.

Foster, Walter H., New York, N. Y.—Selling agent for Baush Machine Tool Company, Landis Machine Company and the Landis Tool Company.

General Electric Company, Schenectady, N. Y.—Reception room and automatic machine showing lantern slides of machines and installations.

Goldschmidt Thermit Company, New York, N. Y.—Samples of Thermit welds including a large weld on a 9¼-in. 2 throw crank shaft for refrigerating machine. Materials and apparatus used in locomotive shops for Thermit welding; such as preheaters, crucibles, mold box, special mixtures of Thermit, etc. Samples of metals free from carbon and numerous photographs and transparencies of Thermit welding operations.

Grip Nut Company, Chicago, Ill.—Grip nuts.

Harrington, Son & Company, Inc., Edwin, Philadelphia, Pa.—Multiple-spindle drill; overhead tramway; travelers; peerless; screw and differential hoists.

Harvey's Sons Mfg. Company, Ltd., A., Detroit, Mich.—The Harvey-Wright pipe wrench.

Heppenstall Forge & Knife Company, Pittsburgh, Pa.—Heat-treated specimens of steel forgings, die blocks and shear knives.

Hollands Mfg. Company, Erie, Pa.—Machinists' solid jaw vises; machinists' swivel jaw vises; combination pipe vises; malleable hinged pipe vises; Hollands pipe cutters; pipe threading stocks and dies.

Hubbard & Company, Pittsburgh, Pa.—Hunt cross-thread nut locks; hot pressed nuts; cold punched nuts, and M. M. slotted nuts; track bolts; rivets and semi-finished nuts; track adzes; track tools, etc.

Illinois Steel Company, Chicago, Ill.—Railroad track bolts and nuts; plain spikes and screw spikes; electric carbon and electric alloy sample steels and specimen tests; transparency views of operations in the manufacture of car, engine and interurban forged steel axles.

Independent Pneumatic Tool Company, Chicago, Ill.—Thor piston air drills for drilling, reaming, tapping, flue-rolling and wood boring; corner drills for use in close quarters; pneumatic riveting, chipping, calking and flue-beading, hammers; pneumatic staybolt drivers; Thor pneumatic grinders; Thor electric drills.

Ingersoll-Rand Company, New York, N. Y.—Pneumatic tools, consisting of "Little David" roller and ball bearing piston air drills, for drilling, reaming, tapping and flue rolling; riveting hammers for driving rivets up to 1¼ in; chipping hammers for all classes of chipping, calking, scaling, flue beading; Imperial air motor hoists—capacity up to 10 tons; Little David jam riveters; Crown holder-ons and Crown bench and floor sand rammers.

International Oxygen Company, New York, N. Y.—The I. O. C. system in operation.

Jenkins Bros., New York, N. Y.—Railway globe angle cross and Y brass valves; special round house valves; steel, iron and brass gate valves; packing, tubing and mechanical rubber specialties for the railway trade.

Johns-Manville Company, H. W., New York, N. Y.—Asbestos and magnesia material, asbestos cements; pipe coverings; boiler lagging; packings, roofings, waterproofing; mastic flooring; J.-M. expander rings; transite and ebony asbestos wood; asbestos shingles, transite asbestos smoke jacks; steel passenger car insulation; refrigerator car insulation; fiber and sectional conduit; electrical materials; J.-M. automatic car seal; flexible armored hose; Jones speedometers for locomotives and passenger cars; cork tilings; linolite lighting.

Jones & Lamson Machine Company, Springfield, Vermont.—One 2 x 24-in. flat turret lathe; double spindle flat turret lathe; Hartness automatic dies.

Jones & Laughlin Steel Company, Pittsburgh, Pa.—Steel sheet piling and tie plates.

Landis Machine Company, Waynesboro, Pa.—One 2-in. double head motor driven bolt cutter; one 1½-in. single head bolt cutter; one 8-in. pipe die head; one 2-in. pipe die head; one ½-in. automatic screw cutting die head; one 1¼-in. automatic screw cutting die head; one ½-in. solid adjustable die head; one 1-in. solid adjustable die head.

Landis Tool Company, Waynesboro, Pa.—Self-contained plain grinder. Represented by Thomas King.

Lawrence & Company, B. F., Buffalo, N. Y.—Combined snow flanger and ballast spreader.

Lea Equipment Company, The, Philadelphia, Pa.

LeBlond Machine Tool Company, R. K., Cincinnati, O.—One 25-in. x 10-ft. motor driven heavy duty engine lathe with 20-hp. motor; No. 3 heavy duty plain milling machine motor driven with rapid power traverse to table; 21-in. x 10-ft. quick change engine lathe with 3-step cone and double friction back gears; No. 1 universal cutter and tool room grinder; 16-in. x 6-ft. portable fitting lathe; various parts of machines showing details of constructions.

Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.—One 16-in. x 6-ft. selective head universal tool room lathe; one 18-in. x 8 ft. selective head manufacturing engine lathe; one 30-in. x 14-ft. heavy forge lathe; one 48-in. x 14-ft. selective head engine lathe.

Lunkenheimer Company, Cincinnati, Ohio.—Valves; oil and grease cups; lubricators; oil pumps; injectors; whistles; cocks and other engineering specialties.

Lutz-Webster Engineering Company, Inc., Philadelphia, Pa.—Lutz universal compression wrench; compression ratchet; noset-screw lathe dog; self-feeding, self-centering "old man"; drill, tap and reamer holder for machine work; one-piece friction ratchet; tap, reamer and stud wrench.

McConway & Torley Company, Pittsburgh, Pa.—Various designs of M. C. B. couplers for freight and passenger service and for locomotives.

Manning, Maxwell & Moore, Inc., New York, N. Y.—Reception booth.

Mark Mfg. Company, Chicago, Ill.—Mark cold drawn steel unions.

Midvale Steel Company, Nicetown, Philadelphia, Pa.—Rolled steel wheels; steel tired wheels; axles.

Monarch Steel Castings Company, Detroit, Mich.—Lion locomotive couplers; Lion freight car couplers; Monarch locomotive pocket castings.

National Malleable Castings Company, Cleveland, Ohio.—Couplers; journal boxes; brake staff mechanism; malleable iron castings.

National Tube Company, Pittsburgh, Pa.—Reception booth.

Newhall Engineering Company, George M., Philadelphia, Pa.—Photographs of Industrial Works wrecking cranes, locomotive cranes and pile drivers; photographs of Winters boiler wash-out system; photographs of Peterson heat treatment furnaces.

Newton Machine Tool Works, Inc., Philadelphia, Pa.—Locomotive radius-link grinding machine; cold metal sawing machine.

Niles-Bement-Pond Company, New York, N. Y.—Niles combined journal turning and axle turning lathe; Pratt & Whitney side-head boring mill; Pratt & Whitney 10-in. vertical shaper.

Nuttall Company, R. D., Pittsburgh, Pa.—Electric locomotive gears and pinions; current collecting devices; railroad machine shop gears and pinions; practical demonstration of heat treatment of steels as applied to electric locomotive gears and pinions.

Parkesburg Iron Company, Parkesburg, Pa.—Charcoal iron boiler tubes; safe ends; arch tubes and locomotive superheater tubes.

Pels & Company, Henry, New York, N. Y.—Punching and shearing machines.

Pollak Steel Company, The, Cincinnati, Ohio.—Special heat treated and oil tempered solid and hollow bored axles for locomotives, cars, freight and passenger; crank pins, piston rods, side rods, connecting rods.

Power Specialty Company, New York, N. Y.—Full size model of Foster locomotive superheater.

Pyrene Mfg. Company, New York, N. Y.—Pyrene fire extinguisher.

Quigley Furnace & Foundry Company, New York, N. Y.—Powdered coal equipment; continuous core oven; photographic display of furnaces and equipment.

Reading-Bayonne Steel Casting Company, Reading, Pa.

Reed Mfg. Company, Erie, Pa.—Machinists' vises; pipe stock and dies; pipe cutters; pipe vises.

Reliance Electric & Engineering Company, Cleveland, Ohio.—Motors for the individual drive of machine tools, both D. C. adjustable speed and constant speed and A. C. constant speed.

Ryerson & Son, Joseph T., Chicago, Ill.—Ulster special staybolt iron; Ulster enginebolt iron; diamond B chisel steel; Nikrome steel for piston rods; crank pins; axles; motion parts; Sweeley adjustable boring bars; Ryerson high speed twist drill.

Scullin-Gallagher Iron & Steel Company, St. Louis, Mo.—Freight car truck equipped with Scullin truck side frames.

Sellers & Company, Inc., Wm., Philadelphia, Pa.—One 54-in. car wheel boring machine, with automatic chuck, pneumatic hoist, and boring bars; power transmission details; locomotive injector and valve details; steel-bronze nuts.

Strong, Carlisle & Hammond Company, Cleveland, Ohio.—Randall graphite sheet lubricator; Mac-It set screws.

Union Spring and Mfg. Company, Pittsburgh, Pa.—Railroad springs, every description; Kensington journal boxes (all steel); steel castings; pressed steel shapes.

United Engineering & Foundry Company, Pittsburgh, Pa.—Photographs of high speed steam hydraulic forging presses.

U. S. Metal and Mfg. Company, New York, N. Y.—Cayuta ball bearing jacks; collapsible stake pocket; "Texoderm" seat upholstering; multiple unit puttyless skylight.

Vulcan Process Company, Minneapolis, Minn.—One complete No. 4 Vulcan oxy-acetylene welding and cutting apparatus with 50-lb. acetylene generator, mounted on truck, and one No. 2 truck mounted portable welding and cutting unit having compressed gases.

Warner & Swasey Company, Cleveland, Ohio.—One No. 2A universal hollow hexagon turret lathe, capacity 2¼ in. x 26 in., 15½-in. swing, completely tooled for producing knuckle pins driven by the General Electric motor; one 3A universal hollow hexagon turret lathe, completely tooled for the production of piston valve followers driven by Westinghouse Electric motor.

Watson-Stillman Company, Aldene, N. J.—Section of hydraulic jack; one or two styles of jacks used mostly in railroad service; blueprints and photographs showing hydraulic tools and machinery used by railroads.

Westinghouse, Church-Kerr Company, New York, N. Y.

Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.—Reception booth with the Westinghouse companies and arc welding exhibit in operation.

Westinghouse Lamp Company, Pittsburgh, Pa.—Lamps used in lighting the booth on the pier.

Westinghouse Machine Company, East Pittsburgh, Pa.—Reception booth.

Wickes Boiler Company, Saginaw, Mich.—Working model of the Wickes vertical water-tube boiler.

Wiener Machinery Company, New York, N. Y.—One Oeking solid steel quadruple combination punch, shear and double bar and angle cutter; two styles of universal radial drills.

Wiley & Russell Mfg. Company, Greenfield, Mass.—Special machine screw taps; stay bolt taps; boiler taps; patch bolt taps; bridge reamers; general line of taps, dies and screw cutting tools and machinery.

Willson & Company, Inc., T. A., Reading, Pa.—Safety glasses for every requirement; Albex eye protectors, Willson safety glasses and the new Willson goggle.

Wilmarth & Morman Company, Grand Rapids, Mich.—New Yankee drill grinders; combination water tool and drill grinders; combination cutter, reamer and drill grinders; surface grinders.

Yale & Towne Mfg. Company, New York, N. Y.—Trolleys; chain blocks; electric hoists; tramrail material and automatic shackles; Yale padlocks; night latches; door closers; signal padlocks; indicator padlocks; dining car locks; end door closers; general service padlocks.

Zug Iron & Steel Company, Pittsburgh, Pa.—Zug and Sable brands of staybolt iron, engine bolt iron, chain iron and forging iron.

The following officers of the Railway Supply Manufacturers' Association were elected at the annual meeting in Atlantic City, June 13, 1914: President, J. Will Johnson; vice-president, Oscar F. Ostby; executive committee, third district, C. E. Postlethwaite and P. J. Mitchell; fifth district, George H. Porter; sixth district, Frank E. Beal.

A New Reagent for Etching Steel

A new reagent for etching mild steel was offered by Walter Rosenhain and J. L. Haughton in a paper before the London meeting of the Iron and Steel Institute, May 7 and 8. In attempting to etch a copper alloy which was attached to a plate of mild steel, the authors employed the ferric chloride reagent ordinarily used for etching brass or bronze. They noticed that while the steel was exposed to the reagent the copper alloy was not acted upon, as was natural, but that the reagent exerted a distinct etching action on a portion of the attached steel which had been polished. The appearance of this was so interesting that they decided to investigate further. So far as their results have gone the authors have found that in order to secure satisfactory and uniform action it is necessary that the composition of the new reagent should conform to the following formula:

Ferric chloride (Fe_2Cl_6)	30 grams.
Hydrochloric acid (conc.)	100 cubic centimeters.
Cupric chloride ($CuCl_2$)	1.0 gram.
Stannic chloride ($SnCl_2$)	0.5 gram.
Water	1 liter.

These proportions have been arrived at after a considerable number of trials in which the composition was rather widely varied. Its use requires considerable care. Thus far the authors have found that in practically pure carbon steels the new reagent yields a pattern which is the reverse of that obtained with the ordinary etching reagents such as picric acid. On hardened steels, especially those of low and moderate carbon contents, the reagent yields very clear results, particularly in the etching of martensite, although in this case the patterns are not reversed as compared with those obtained with picric acid, sulphur dioxide, etc. The principal interest and importance of the new reagent, however, lies in the fact that it reveals in a clear and striking manner the distribution of phosphorus, particularly in mild steels, yielding results which compare favorably with those hitherto obtainable only by the heat-tinting method devised by Stead. It may be stated at once that the action of the new reagent consists in the deposition on the surface of the steel of thin films of metallic copper.

In a mild steel exhibiting the usual pearlite-ferrite structure it is found that whereas the ordinary etching reagents, such as nitric acid, picric acid, etc., rapidly darken the pearlite by attacking and roughening it, leaving the ferrite practically unaltered, the new reagent reverses this procedure. The pearlite is left untouched, appearing white and bright under normal light, while the ferrite is covered with a film of copper having a slightly rough surface texture, and therefore appearing black under normal light, particularly if the period of etching has been somewhat long. The resulting effect is, however, striking. When applied to quenched steel, the new reagent yields patterns which are of the same kind as those produced by other means, that is, there is no reversal in this case. It, however, develops the structure of martensite, particularly in low carbon steels quenched from a high temperature, in a remarkably clear manner.

On applying the new reagent to polished longitudinal sections of commercial steels, it was found that the etching action resulted in the appearance of a strongly marked banded structure which instantly recalls the typical banded appearance obtained in phosphorus steels by Stead's method of heat-tinting. The great delicacy with which the new reagent reveals even the more minute details of phosphorus distribution in mild steels affords an interesting means of studying that distribution.

EXPORTING MACHINE TOOLS

Able Competition Must Be Met in All Foreign Countries

BY CARL GEBÜHR*

Some years ago, when all the facilities of American machine-tool makers were needed to take care of the demand from rapidly growing home industries, manufacturers could afford to ignore the possibility of exporting their products and most of them gave little thought to the subject. To-day, such of them as are not doing and not seeking an export trade are confined practically to those who make special machinery which has little or no competition and whose attention is still absorbed by the domestic market.

DELAY HARMFUL TO FUTURE BUSINESS

The manufacturer who is not exporting his goods is losing more than the opportunity of selling abroad—he is losing chances of getting a share of the export business in the future, inasmuch as he is neglecting to lay the foundation for it. Something not generally known, but easily proved by statistics, is that the exporting of American machine tools to Europe has been on the decline for the past few years and the time is coming when manufacturers will encounter still greater difficulty in finding a market on the other side, no matter what kind of machines they make. A few years ago even the heaviest types of machine tools found a ready market abroad, but to-day it is only the medium and small-sized tools that have a fair chance of sale and even these smaller sizes are losing ground. Manufacturers of lathes and planers can testify that their export business in the last few years has been of smaller volume; the lathe manufacturer, especially, experiencing difficulty in keeping his export figures anywhere near what they were in former years. This is not due, by any means, to his product being of inferior workmanship or of obsolete design, but to fast growing European competition. Since the European machine-tool builders started to specialize and introduce American methods, they have become competitors who merit serious consideration.

EUROPEAN COMPETITION MAY STILL BE MET

A few years ago there was no question of the superiority of the American-made machine tool, as regards both workmanship and design, but the foreign tools have now reached a stage where they are recognized as being of first-class construction, with the additional advantage of being far lower in price. The high wages which the American manufacturer is compelled to pay place him under a great handicap when it comes to competing with a foreign industry whose workmen receive 30 to 40 per cent. less in wages, for if two tools of equal workmanship and design are offered to a prospective purchaser, it follows that price will be the deciding factor.

Of course, not all possibility of selling American tools in Europe is gone. It will be a few years yet before the European built machine will reach a standard uniformly equal in finish and design to the American product, and with the special efforts some manufacturers are putting forth they are still able to obtain a good portion of the foreign business. It would be well, nevertheless, for them to realize that in Europe, where they have reaped a harvest for a number of years, they are going to lose ground surely and steadily. More important than the loss of this market, however, is the decided fact that a competitor of unquestioned ability is ready to meet them in other fields.

CAMPAIGN NECESSARY IN GROWING COUNTRIES

The situation as it exists to-day is being taken too lightly by many manufacturers and not given the consideration it deserves. On several occasions the United States Government has called attention to the fact that South America presents fine opportunities for export trade and countries are specified where the greater portion of the present business in machinery is in the hands of foreigners, the United States not getting its share. It is true that South America is not everywhere ready for high-class machine tools, but great progress is being made in that direction and in a few years it will require a vast amount of equipment, its machinery trade already being of no small proportion. After the opening of the Panama Canal it is to be decided whether Europe or the United States will govern the commercial destiny of the world, and one field in which the test will be made is South America. If the American does not want to be left hopelessly behind he should begin at once a progressive campaign.

Few American manufacturers are sending their own men to foreign countries, most of them preferring to be represented by export agents. In this connection it may be noted that a proposal has been made for the establishment of a central bureau in one of the principal European cities for the display and sale of American machine tools, but nothing has ever come of the idea, undoubtedly because it is considered that first-class domestic agents insure better results at less expense. It is not enough for the manufacturer to be merely represented and to receive many promises and few orders. Only firms of unquestioned reputation should be employed—firms which have branches and connections widely scattered and whose ability to render the service agreed upon has been proved. The manufacturer should guard most carefully against alluring statements that are made to secure the agency for his product, but which will not be followed by actual business.

*Alfred H. Schütte, New York.

Hickman, Williams & Co. Changes

At the recent annual stockholders' meeting of Hickman, Williams & Co., H. L. Williams was elected president to succeed R. B. Hickman. Mr. Hickman becomes vice-president and director. No other changes were made among the officers or directors. F. M. Eaton will retire from active management of the Cincinnati office on account of his health. He retains his interest in the business and remains on the board of directors.

E. P. Hettiger, who has been in charge of the Cincinnati office during the absence of Mr. Eaton, will succeed him permanently.

John O. Henshaw retired June 1 from the management of the Philadelphia office, and will be succeeded by Coleman Ward, whose headquarters will remain in Pittsburgh. Mr. Henshaw will take over the Boston office of Hickman, Williams & Co. for his personal account on August 1.

The production of coal in Alabama in 1913 was 17,678,522 net tons, valued at the mines at $23,083,724, according to figures compiled by E. W. Parker, of the United States Geological Survey. The increase over 1912 was 1,577,922 net tons.

The Machinery Markets

Bumper crops are frankly depended upon everywhere to swing trade back to its healthy normal. While the 5 per cent. freight increase is admitted to be a much-needed stimulant, it is no longer considered a heal-all. The one widely active line today is agricultural machinery; otherwise an almost unbroken dullness, that can by no means be attributed to the summer season, has deadened the machinery trade. New York is featureless, many dealers and buyers being away at conventions. A slight improvement in demand and orders has been noticed. In New England, while demand has dwindled, there is an absence of worry; as conditions are there regarded as partly seasonable. There is a minimum of both inquiry and sales in Chicago. Some interesting sales of special machines have been noted in this quarter. Milwaukee appears to be making a slow and laborious recovery from the long-continued depression. Both Cleveland and Cincinnati report requirements and actual orders as very light. Here and in Detroit jobbing foundries are still on the 50 per cent. basis. Single tools and special lines are selling fairly well in Detroit. The Central South and Birmingham are quiet. An inquiry for twenty-two wood-working machines is a feature of the Wheeling requirements. A strong local demand for farm and harvesting equipment has strengthened business in and about St. Louis, where the sentiment is growing that the worst conditions have been met. Excellent cotton and corn yields have livened the entire machinery and tool trade in Texas. Sections far to the north in the Pacific Northwest are experiencing a good run of miscellaneous business, also due to harvest activities.

New York

NEW YORK, N. Y., June 17, 1914.

Machine tool dealers do not agree on the present trend of the market. Nothing worthy of particular note has come out in the past week. Dullness is so general that a decent inquiry or order has an exaggerated weight in prejudicing judgment. A slight improvement is quite generally conceded, but there is no strong ground for presuming that it indicates a continued improvement. Present purchases are required for immediate delivery to supply the bare necessities of manufacturing. Second-hand tools are selling fairly well. Trade here is held back somewhat by the absence of many dealers and buyers at the conventions of the Master Car Builders' and Master Mechanics associations at Atlantic City, N. J.

Walter Kidde, 140 Cedar street, New York City, engineer, is completing plans for a foundry for Cyrus Currier & Sons, Newark, N. J., 50 x 125 ft., brick and steel construction. Specifications include a traveling crane, overhead monorail system, etc.

George H. Storm & Co., 521 East Seventy-second street, New York City, is erecting a three-story reinforced concrete garage, 125 x 200 ft. The Automobile Club of America, 247 West Fifty-fourth street, is the lessee. It will contain the most modern equipment possible for automobile use, including a repair shop. William H. Gompert, 171 Madison avenue, New York City, is the architect.

The Maag Gear Company, 1876 Broadway, New York City, has been incorporated to manufacture gears, especially for electric locomotives, elevators, etc., and has acquired factory quarters. It will be in the market for some machine tools. Carl Klaiber is manager.

The city of Binghamton, N. Y., has authorized the issue of $148,200 worth of bonds for the erection of a municipal lighting plant.

The King Sewing Machine Company, Buffalo, N. Y., is building an addition to its foundry. No additional equipment is required.

The Gibson & Kirk Company, 157 East Montgomery street, Baltimore, Md., lock and bell hanger manufacturer, is erecting a shop and foundry at 211 Key Highway, to cost $4800. New equipment has been contracted for.

The Authentic Realty Company, 103 Park avenue, New York City, will build a factory, 90 x 100 ft., three stories, on a site in Long Island City. P. E. Lindblad is president. Buchman & Fox, Madison avenue and Forty-second street, are the architects.

The John Kroder & Henry Reubel Company, 108-128 Meeker avenue, Brooklyn, N. Y., will build a factory at Herbert and Monitor streets, Brooklyn. Richard Berger, 309 Broadway, New York City, is the architect.

The Weinlinger Steel Piling Company, 11 Broadway, New York City, is taking bids this week for a factory 50 x 120 ft., one story, which it will erect at Kingston, N. Y. The estimated cost, with equipment, is $40,000.

The U. S. Smoke Eliminator Company, Buffalo, has been incorporated to manufacture consumers' fuel economy devices, etc. C. D. Ream, H. T. Cooper and C. H. Weiss are the incorporators. The capital stock is $50,000.

The Fisher Machine & Tool Company, Buffalo, has been incorporated by E. Fisher, F. Fisher and W. Carey. The capital stock is $15,000. It will take over and enlarge the business and plant of E. Fisher, 98 Broadway, Buffalo, manufacturer of tools and small machinery.

The Upson Company, Lockport, N. Y., manufacturer of wall board, etc., has let the contract for an addition to its plant.

The Ramco Mfg. Company, Schenectady, N. Y., has been incorporated to manufacture vending machines, patented devices, etc., by A. Cramer, S. and S. A. Pearson, Cherry Valley, N. Y. The capital stock is $100,000.

The Union Forging Company, Union, N. Y., of which Frank S. Fitchener is president, will build a fireproof addition to its plant.

The Rochester Pneumatic Crown Seal Company, Inc., Rochester, N. Y., has filed incorporation papers showing a capitalization of $75,000 and will engage in the manufacture of Crown seals, etc. The incorporators are F. Brodt and F. Miller, Rochester, and A. C. Buell, Canandaigua, N. Y.

The Erie Foundry Company, Rochester, N. Y., has purchased the old foundry plant of the American Laundry Machinery Company on Dewey avenue, and is refitting it to be used as a jobbing foundry to make high grade machinery castings. An addition will be erected 30 x 145 ft. for additional molding space, and a cleaning shop, 40 x 100 ft. One 72-in. cupola and other new machinery are being installed, so that the capacity of the present plant will be doubled.

New England

BOSTON, MASS., June 16, 1914.

A typical condition of summer dullness characterizes the New England industries. With comparatively few exceptions all lines of manufacture are feeling the depression, and the owners do not look for any change until early fall. It is very significant that comparatively few manufacturers are worrying. There is an absence of the despondency that usually accompanies a general let-down of demand. The explanation is apparently that few believe present conditions can continue for any serious length of time.

Most works are running on reduced hours. Few of the best class of workmen are idle because employers are striving to divide up the hours of employment, so that so far as possible everyone whom they want to keep can get a share of the work. Never before have the owners accomplished this with such a degree of success. In fact, no such systematized attempt has been made previously.

The reorganization of the Pratt & Cady business at Hartford, Conn., has been completed by the formation of a new corporation known as the Pratt & Cady Company, Inc. The officers are Walter B. Lashar, Bridgeport, Conn., president; Bishop White, Bridgeport, Conn., treasurer; W. F. Whitmore, Hartford, Conn., vice president and general manager; E. L. King, Hartford, Conn., secretary. Mr. King was the receiver of the old company. The new organization will continue the manufacture of valves and hydrants.

The Buchanan & Bolt Wire Company, Holyoke, Mass., will use its new building for its dandy roll and wire drawing departments. No new machinery will be required. The structure will be 26 x 57 ft., two stories.

The Cowan Truck Company, Holyoke, Mass., has not yet completed plans for the creation of larger manufacturing quarters. The business has developed rapidly in the last two years, and to the line of trucks has been added a storage

battery industrial truck which is said to be the first elevating electric truck on the market.

The Union Twist Drill Company, Athol, Mass., states that it is not prepared to make any announcement as to the equipment which will be required for the large additions that are to be erected at Athol and at Rock Island, P. Q., just across the line from its works at Derby Line, N. H. The extensions will be on a large scale to take care of the rapidly growing business of the company. At Athol two buildings will be erected, one 60 x 120 ft., three stories, the other 25 x 100 ft., one story. At Rock Island there will also be erected two buildings, one 60 x 180 ft., three stories, and the other 80 x 137 ft., one story. All of these buildings will be of brick and reinforced concrete.

Referring to the purchase of the Johns-Pratt Company, Hartford, Conn., of stock of the Hart & Hegeman Company, Hartford, Conn., the transaction gives a control of the latter business to the Johns-Pratt Company. However, no change will be made in the method of marketing the product of the Hart & Hegeman Company, the purchase of stock representing an investment. Both companies manufacture electrical specialties.

The Howe Scale Company, Rutland, Vt., is making large additions to its works. A building 40 x 190 ft. and three stories in hight will be used in connection with the foundry and will be equipped with the necessary machinery for cleaning castings as they leave the foundry and for other similar work. The building will be of steel and concrete. Also the wood-working department will be increased by raising its present building, making it two and one-half stories instead of the present one story. The purpose is to give additional capacity for the manufacture of trucks, which business is increasing rapidly.

The Clark Brothers Bolt Company, Milldale, Conn., has let a contract for the erection of an addition to its works, known as Plant No. 1, which will take the place of the present Plant No. 2, recently leased to the Barnes & Kobert Mfg. Company, New Haven, Conn. The new building will be 98 x 240 ft.

The Wells Chemical Bronze Works, Worcester, Mass., manufacturer of non-ferrous metal castings, will build a new plant in that city at Harding and Temple streets to replace the property on Summer street, which was recently sold. The new building will be 40 x 60 ft., one story.

The Bay State Elevator Company, Springfield, Mass., states that it has made no definite plans for the contemplated new building which it is proposed to erect at East Springfield. The tentative plans call for a structure 80 x 250 ft.

The Plume & Atwood Mfg. Company, Waterbury, Conn., has awarded the contract for an additional factory building, 50 x 180 ft., five stories.

Philadelphia

PHILADELPHIA, PA., June 16, 1914.

The Standard Dental Mfg. Company, Twenty-fifth and Diamond streets, Philadelphia, has awarded the contract for a two-story addition to its factory, 23 x 26 ft., brick construction.

Spang & Co., Butler, Pa., manufacturer of well supplies, pipe fittings, etc., will build a four-story concrete factory, 60 x 145-ft., with ell 60 x 70 ft., to be used as an addition to its machine shop, etc. The estimated cost is $30,000.

The Martin & William H. Nixon Paper Company, Nixon street, Manayunk, Pa., is building a one-story factory, 180 x 200 ft., of brick construction, to cost about $40,000.

The A. S. Karatz Company, Inc., South Richmond, Va., has begun work on the erection of a factory at Third and Decatur streets.

C. H. Henry, secretary of the electrical commission, Easton, Md., will receive bids until noon, July 8, for engines, generators and power plant equipment.

Chicago

CHICAGO, ILL., June 15, 1914.

Machinery dealers are welcoming the vacation period as offering a legitimate excuse for getting away from a discouragingly dull market. Miscellaneous inquiry and sales of both new and second-hand tools has dwindled to a minimum while the railroads are doing little or nothing. Some interesting sales of special type machines including a rail cutting saw for the Chicago & Northwestern are reported.

A. G. Spalding & Brothers Mfg. Company has acquired the property at the northwest corner of LaSalle and Fifty-fourth streets, 64 x 91 ft., opposite their present factory, to be used in the future for extensions.

The Midland Structural Steel Company, Chicago, has been organized with a capital stock of $8000 by Orville A. Scudder, John B. Synnestvedt and Albert H. Roesler, 4149 Prairie avenue.

The Howard Seipp Brewing Company, 2513 Ingleside avenue, Chicago, is planning a blacksmith and repair shop, to cost $20,000.

The J. E. Robinson Mfg. Company, Chicago, has been organized with a capital stock of $2500 to manufacture and deal in mechanical devices and specialties. Organizers: James E. Robinson, Harry W. Kuetemeyer and Samuel J. Lumbard, 105 North Clark street.

The American Car & Foundry Company, 2533 South Wood street, Chicago, is planning a one-story addition to its local plant.

The Universal Steel Products Company has been incorporated with a capital stock of $2500 by Norman J. Tieman, Joseph D. McCord and Wilmer C. Bennett, 252 West Sixty-fifth street.

Harold M. Pitman, 5457 Blackstone avenue, Chicago, has had plans prepared for a one-story factory, 75 x 80 ft., to be erected at Fourteenth place and Rockwell street, at a cost of $10,000.

The Vulcan Engineering Sales Company, Elston avenue, Chicago, is in the market for a 150-hp. gas or oil engine to drive a dynamo for the generation of electrical power.

The Illinois Spring & Stamping Company, 10 S. LaSalle street, Chicago, has increased its capital stock from $50,000 to $100,000.

Plans are being made for the improvement of the water works at Palmyra, Ill., by adding a filtration system and pump.

The Rural-Road Machinery Company, Quincy, Ill., has been organized with a capital stock of $10,000, to manufacture and deal in road machines. Organizers: A. Akers, W. J. Heintz and John L. Loebbing.

The Illinois Oil Company, whose office is at Rock Island, Ill., is planning to erect a new factory, 160 x 300 ft., of steel and concrete construction with asphalt flooring at an estimated cost of about $60,000. New and modern machinery, including hydraulic presses, will be installed, which will cost in the neighborhood of $50,000.

The Modern Iron Works, Quincy, Ill., which recently took over the Hayton foundry, proposes to construct a foundry building, 70 x 160 ft.

The P. F. Murk Foundry Company, South Beloit, Ill., is planning the erection of a 60 x 80 ft. addition next fall, to be of concrete block construction.

The Tiger Vehicle Company, Moline, Ill., has been organized with a capital stock of $100,000, by F. G. Allen, A. C. Barber, C. R. Stephens, C. A. Banister and L. C. Blanding, to manufacture and deal in buggies, carriages, vehicles of all kinds, farm implements, etc.

The Bonner Tool Company, Champaign, Ill., has increased its capital stock from $150,000 to $700,000 for the purpose of extending its operations.

The Arcady Farms Milling Company, Roundout, Ill., has been incorporated with a capital stock of $50,000 by T. F. Parker, T. J. Keogh and C. E. Hamill and will equip a mill.

The Peoria Produce, Iron & Metal Company, Peoria, Ill., has been incorporated with a capital stock of $10,000 by Max, Jacob and Isaac Cohen, and will install equipment for handling old material.

The town of Stanton, Iowa, has voted to erect a water works plant.

The City Council, Des Moines, Iowa, has authorized the construction of a new northwest sewer system, at an estimated cost of $300,000.

The city clerk, Coldwater, Kan., will receive bids until June 25, for one 100-hp. oil engine, one 75-kw. generator, etc.

The Zimmerman Steel Company, Lone Tree, Iowa, will take over the business of William Zimmerman & Sons, manufacturers of stump pullers, scales, castings, etc. Plans are under way for increase of output, but requirements for equipment have not been completed. H. L. Zimmerman is president.

Milwaukee

MILWAUKEE, WIS., June 15, 1914.

The very promising crop outlook has a marked strengthening effect on the metal-working industry here. Immediate business is slow to close and recovery from the dullness of the last six or eight months is progressing rather laboriously. The large volume of business in agricultural and farm machinery is notable. The past week has been one of the best since January 1, both from the standpoint of inquiries as well as bookings. The more optimistic machinery people see in the present situation the coming of a turn for the better,

deliberate but certain. The conservative element admits that matters have stopped growing worse.

The Franzen Investment Company, Milwaukee, has commissioned Schnetzky & Son, architects, to plan a $100,000 factory, salesroom and office building, 75 x 136 ft., four stories, on East Water street, near Buffalo. It will be of steel and brick construction. Plans will be ready about June 24. The name of the occupant is withheld for the present.

The Up To Date Machine Company, Green Bay, Wis., is advertising in Milwaukee newspapers for a location for a manufacturing and jobbing machine shop.

Peter Paulson, Neillsville, Wis., is erecting a garage and machine shop, 42 x 80 ft., and is buying a small amount of tools.

A gasoline engine shop, to include a commercial machine shop, is being erected at Oconto Falls, Wis., by Joseph Kaufmann, who is now buying equipment.

Fred Wright, Oconto, Wis., has broken ground for a garage and machine shop for occupancy by his son, Earl F. Wright. The investment will be $5000.

The Arneson Foundry Company, Kenosha, Wis., is building a foundry, 50 x 90 ft.

The Island Creek Coal Company, Superior, Wis., is planning to install a modern coal-handling plant at its dock to replace that destroyed by a storm two weeks ago. Contracts have not been awarded as yet.

The Hamilton Beach Mfg. Company, Racine, Wis., is planning a new factory building, of brick and steel construction, three stories, to cost about $35,000. Guilbert & Funston are the architects.

R. Messmer & Bros., architects, Milwaukee, Wis., have started plans for the $100,000 power plant, heating and lighting system and sewage plant of the Milwaukee County tubercular sanatorium.

Detroit

DETROIT, MICH., June 15, 1914.

The betterment of conditions which was noted in the local machinery market last week still continues. The trade reports a fair run of single tool orders and some demand for special equipment of various types. There is an absence of live new inquiries and there is nothing in sight to presage continued activity. There is a general feeling among business men that general conditions will be much improved after Congress has adjourned and political questions are in some measure settled. Conditions in the foundry trade are inclined to dullness.

The Eclipse Interchangeable Counterbore Company, Detroit, has been incorporated with a capital stock of $25,000 to manufacture drills, counterbores and other tools. The incorporators are Emil Gairing, Judson Bradway and M. M. Mitchell.

The Lakeside Foundry Company, Detroit, has been organized to conduct a foundry business by William Blanck, A. Russell Keys and Edward Stephens. It is capitalized at $40,000 and has acquired a unit of the former plant of the R. C. H. Corporation for its factory.

The Hermann Engineering Company, Detroit, has been incorporated with $25,000 capital stock to manufacture gasoline engines. The incorporators are Alfred Gibbons, M. P. Friedrich and Karl L. Hermann.

The F. Joseph Lamb Company, Detroit, has been incorporated with $3000 capital stock to manufacture automobile starters. F. Joseph Lamb and John W. Fitzgerald are the principal stockholders.

The Dodge Motor Car Company, Detroit, has increased its capital stock from $1000 to $100,000.

The Paige-Detroit Motor Company, Detroit, Mich., will equip a garage and repair plant to cost $20,000 at Memphis, Tenn. Hanker & Cairns, Memphis, are in charge of the work.

The city of Charlotte, Mich., has voted a $5000 bonus to retain the plant of the Fenn Mfg. Company. The company, which manufactures special farm tools, will enlarge its factory to a considerable extent.

The village of Pigeon, Mich., has voted in favor of bonding for $7000 to provide for the erection of a municipal electric light plant.

The Pallau Steel Company, Mt. Clemens, Mich., has been incorporated with $75,000 capital stock to manufacture automobile springs. Plans are being prepared for a factory 75 x 175 ft. The officers are A. T. Donaldson, A. J. Pallau and C. D. Jackson.

The Seehausen-Wehrs Company, Chicago, is removing its business to St. Joseph, Mich., where a new plant is being established. It manufactures a number of patented metal devices.

The Alt-Batsche Company, Grand Rapids, Mich., has been incorporated with $10,000 to manufacture furniture. Nicholas J. Alt and Ignatz H. Batsche are the principal stockholders. A factory has been acquired.

Work has been begun on the central heating system plant at Saginaw, Mich., a franchise for the operation of which was granted some time ago to Herbert F. Wills, Logansport, Ind.

A. E. Saum, Niles, Mich., will erect a garage and machine shop, 66 x 134 ft., two stories.

The Lewis-Hall Iron Works, Detroit, Mich., has been organized with a capital stock of $175,000 to succeed and carry on the structural business formerly conducted by and in the name of Henry B. Lewis. The incorporators are Henry B. Lewis, Harry S. Hall and W. Howie Muir. The corporation will broaden its field of operation and handle the larger designs of steel structures.

The Bissell Carpet Sweeper Company, Grand Rapids, Mich., has acquired a four-story building adjoining its present plant, which it will remodel for use as an addition.

The Celfor Tool Company, Buchanan, Mich., has begun work on the new addition to its plant. The building will be 100 x 160 ft., one story.

The contract is about to be let for the erection of the factory of the Brown-Wall Gas Engine & Pulley Company, Holland, Mich.

Work will soon be commenced on the rebuilding of the foundry of Carroll Brothers, Houghton, Mich., which was destroyed by fire several weeks ago. The new plant will offer larger and better facilities than the one destroyed.

Indianapolis

INDIANAPOLIS, IND., June 15, 1914.

The Majestic Furnace & Foundry Company, Huntington, Ind., will add a story to its machine room and enlarge its furnace room, which will increase its plant capacity one-third.

Williams Machine & Mfg. Co., Vincennes, Ind., has been organized with a capital stock of $10,000 to conduct a general machine and repair shop. The organizers are H. M. Williams, J. Frank Whyte and O. L. Williams.

The Ft. Wayne Machinery Company, Ft. Wayne, Ind., successor to the Hanna-Brackenridge Company, has reopened the shop of the former company and will take up the work of the old organization in practically the same way that it was formerly conducted.

The Plost Post Company, Marion, Ind., has secured the old Deihl Forging Company plant in North Anderson and will make improvements costing several thousand dollars. This concern makes steel fence posts and also cattle guards for railroad use.

The Nutter Gearwood Company, Seymour, Ind., has been incorporated by Alonzo Nutter, Nathan Kaufman, and others, to manufacture gearwoods for vehicles. A factory 50 x 150 ft., two stories, and a boiler room 30 x 40 ft., has been built and will be equipped with the latest type of machinery. Alonzo Nutter is president and C. B. Davis secretary.

The Cyclops Cyclecar Company, Indianapolis, has been incorporated with $10,000 capital stock, to manufacture motor cars. The directors are J. W. Smith, Indianapolis; J. W. Ferree and C. A. Hargrave, Danville, Ind.

The city of Huntington, Ind., will move its municipal lighting plant and will spend about $35,000 in improvements.

The American Underslung Company, Indianapolis, has been incorporated with $50,000 capital stock, to build automobiles. The incorporators are Clarence M. Brown, Albert D. Ogborn and Ernest Duncan.

The Wayne Oil Tank & Pump Company, Ft. Wayne, Ind., has increased its capital stock $100,000.

The Hoadley Stone Company, Stinesville, Ind., will make improvements to its plant that will cost $75,000 to $100,000. B. G. Hoadley is manager.

Cleveland

CLEVELAND, OHIO, June 15, 1914.

The feeling in the machinery trade is slightly better. Machine tool builders see indications that the car companies and other plants making railroad equipment will come in the market before long for machinery that they will need when the demand for cars and railroad equipment becomes active. The call for punching and shearing machines is somewhat better, the improved demand coming mostly from structural shops.

Automobile makers are buying very few standard tools, but are adding some special machinery. The automobile trade has reached a point where the margin of profit is smaller and makers are paying more attention than ever before to the matter of reducing manufacturing costs and are installing special machinery for this purpose where it can be used to advantage. One Cleveland plant making drilling machinery, which also devotes considerable attention to special machinery along this line for the automobile trade is running its plant full time on actual orders and reports that it has enough work ahead to keep it running full about four months. Reports from dealers indicate little change in conditions. Orders and inquiries are light. However, one new inquiry for quite a number of machines came out during the week. The outlook has improved in some lines of general machinery. There is more inquiry than for some time for turbines, coke oven equipment and some other lines. Makers of ore handling equipment are figuring on a handling plant that the Bethlehem Steel Company is considering installing on Staten Island for unloading ore from its Chilean mines.

The contract for a large warehouse to be erected for the William Bingham Company, Cleveland, wholesale and retail hardware dealers, has been awarded Crowell-Lundorf-Little Company. The building will be of brick, steel and concrete, 200 x 435 ft., eight stories. Considerable mechanical equipment will be required.

Albert M. Allen, architect, Cleveland, has prepared plans for a steel and concrete factory building for Hinde & Dauch, Sandusky, Ohio.

The Jiffy Jack Company, Cleveland, has been incorporated with a capital stock of $50,000 by J. P. Engle, and others, to manufacture automobile accessories.

The Tinnerman Steel Range Company, Cleveland, will build a three-story brick factory building, 70 x 107 ft.

The Massillon Aluminum Company, Massillon, Ohio, has its new plant under way and expects to have it in operation within thirty days.

The Mutual Machine & Supply Company, Van Wert, Ohio, has been organized to handle new and second hand machinery and gas engines. The business will be run by W. H. Spayde and Fred Spayde.

The plant of the Huffman Traction Engine Company, Kenton, Ohio, has been sold at bankruptcy sale to the Ohio Steel Foundry Company, Lima, Ohio.

J. B. Breymann has awarded a contract for the erection of a new factory building at 1025 Front street, Toledo. The building will be two stories, 83 x 161 ft., and will be occupied by the Peerless Bedding Company and the McCreery Mfg. Company.

W. J. Sherman has been given the contract for preparing plans and supervising a new high pressure pumping station, to be built in Toledo, Ohio.

The C. & G. Cooper Company, Mt. Vernon, Ohio, is building for the Logan Natural Gas & Fuel Company a 24 x 48-in. twin tandem compressor unit, which will also drive Ingersoll-Rand hurricane type compressor cylinders. This unit will be installed at the Pavonia, Ohio, pumping station of the Logan Company

The Standard Electric Stove Company, Toledo, Ohio, has been incorporated with a capital stock of $100,000 by P. C. Tiedmann and others.

W. K. Eckfeld has purchased at receivers' sale the plant of the Dennison Foundry & Engineering Company, Dennison, Ohio. A new company will probably be organized and the operation of the plant resumed.

The foundry of the Norwalk Machine & Foundry Company, Norwalk, Ohio, was burned June 5, the loss being $5000. Andrew Hamilton, the proprietor, announces that he will re-build at once.

Cincinnati

CINCINNATI, OHIO, June 15, 1914.

Actual business, as well as inquiries, continue scarce with both machine tool builders and dealers. A few sporadic orders from abroad tended to divert attention to the export trade. This is augmented by the announcement that four leading machine tool builders sailed for Europe this week, to be followed later by two others, who hope to be able to stir up the export end of the business. The principal encouraging factor in manufacturing circles continues to be the good crop reports that are being disseminated. With such a large freight tonnage in sight, it is difficult for the layman to understand how the railroads can keep out of the market for shop equipment very much longer.

Second-hand machinery, of all kinds, is dull, although a few sales of re-wound motors and generators have been reported. The jobbing foundries are jogging along at the same pace as during the past three months, and few are operating to more than 50 per cent. of capacity.

It is reported that the Charles H. Boldt Glass Company, Cincinnati, is in the market for two large blowers. No information is available as to the size of fan wanted.

The Eagle Mfg. Company, Cincinnati, will soon commence work on an addition to its brass foundry. The company's increase of capital stock from $50,000 to $100,000 was recently noted.

The Union Thread Company, Carthage-Cincinnati, Ohio, contemplates making an addition to its factory that will be 25 x 40 ft., three stories, and of regular mill construction.

The Dalton Adding Machine Company, Cincinnati, has been incorporated with $2,750,000 capital stock. Mention was recently made regarding plans for moving the company's plant to Norwood, Ohio, a Cincinnati suburb.

The Covington Multiple Drill Company, Covington, Ky., has been incorporated with $8000 capital stock by Albert Kern, Covington, and Philip Fosdick and R. K. LeBlond, Cincinnati, Ohio. It has been operating a plant at Fifth and Scott streets for several months.

The American Bung Mfg. Company, Cincinnati, has increased its capital stock from $50,000 to $60,000, but no immediate additions to its factory are planned.

The Hawkins Cycle Car Company, Xenia, Ohio, has acquired the plant of the Baldwin Motor Company, that will be fitted up for manufacturing cyclecars.

The McIntire Construction Company, Springfield, Ohio, has secured contract for the construction of the Springfield Brass Company's new plant, recently mentioned as contemplated.

In addition to car barns and shops recently mentioned as contemplated by the Springfield Street Railway Company, Springfield, Ohio, a new power house is planned.

The Piqua Machine Company, Piqua, Ohio, is a new partnership, composed of Frank O'Brien and Carl Herwig. It is equipping a machine shop to do repair and experimental machine work.

The Logan Pottery Company, Logan, Ohio, intends increasing the capacity of its plant at an early date. No equipment details are available.

The Dayton Piston Ring Company, Dayton, Ohio, was recently organized by P. W. Klinger and others. The company's plant is at Broadway and Chapel road.

The Holly Mfg. Company, Buffalo, N. Y., has been awarded contract for an additional pumping unit to be installed in the municipal waterworks plant of Columbus, Ohio.

The Scioto Fire Brick Company, Sciotoville, Ohio, is having plans prepared for rebuilding its plant recently destroyed by fire.

The municipality of Barberton, Ohio, is advertising for bids on the construction of an electric lighting and power plant.

St. Louis

ST. LOUIS, MO., June 15, 1914.

A continuation of the improvement in sentiment in the machine tool market is to be noted in this section and the belief is growing among the dealers that the worst is over with. The inquiries which are coming in are more definite and there is plenty of evidence that the interested industries are not making inquiry to kill time. The improvement is general in character no particular section or class of machinery standing out above another. As is natural at this period of the year, machinery of the agricultural type and portable power character are more active because of the arrival of the harvesting period in the winter wheat belt. Manufacturing industries are looking the ground over carefully and there is likelihood that more demand will come from this division of the trade shortly. Second hand tools are in rather light request. Dealers report collections in good shape and plenty of money available for industrial extension once the sentiment improves.

A large part of the plant of the Mallinckrodt Chemical Company, St. Louis, was destroyed by fire June 11, with a loss of about $220,000, including considerable mechanical equipment. It will be replaced at once.

SCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

The John C. Roever Feed & Milling Company, St. Louis, has been incorporated with a capital stock of $35,000 by J. C. Roever, George F. R. Wittich and J. H. Roever, and will equip a feed mill.

S. W. Milligan, Joplin, Mo., is reported in the market for heating and power plant equipment, including an electric power plant, vacuum cleaning plant, etc., for a large hotel building.

Two stories will be added to the plant of the Marietta Chair Company, Marietta, Ohio, at Kansas City, Mo., but the question of additional equipment has not been fully determined.

A 100-ton balanced-bucket coal plant will be built and equipped at St. Joseph, Mo., by the Chicago Great Western Railroad, under the direction of L. C. Fritch, chief engineer, Grand Central Station, Chicago, Ill.

The Laclede Gas Light Company, St. Louis, will equip a machine shop, tools to cost about $10,000 being installed.

The city of Hume, Mo., through the mayor, is preparing to place an electric light franchise with the best bidder prepared to install equipment immediately.

The Excelsior Tool & Machine Company, Thirtieth street and Ridge avenue, East St. Louis, Ill., has not completed plans for machinery equipment in its factory addition. Plans will not be completed until the buildings are finished. The company is now in the market for a good second-hand upright slotting machine, with about 14-in. stroke and a large feed table. T. F. Philippi is manager.

The Little Rock Compress Company, Little Rock, Ark., of which W. M. Kavanaugh is president, which is to equip a compress at Argenta, Ark., will require, it is stated, about $100,000 of machinery.

The city of Stuttgart, Ark., has plans for the equipment of municipal electric light and water plants. The mayor should be addressed.

The Carnahan-Allport Lumber Company, Geridge, Ark., has been incorporated with a capital stock of $75,000 by R. and G. C. Carnahan, and others.

T. O. Smith, W. O. Spratt and T. J. Coffey, Texarkana, Ark., will equip a bottling plant, about $25,000 of machinery being required.

The Prescott & Northwestern Railway, whose shops at Prescott, Ark., were burned, will replace them, together with about $10,000 worth of necessary equipment.

The Myers Stave & Mfg. Company, Piggott, Ark., is reported in the market for boiler, engine, pump, heater, etc., for its power plant.

H. B. Schwartz, the city business manager of Collinsville, Okla., will receive bids until June 22 for all necessary equipment for a sewage disposal plant.

The city of Pond Creek, Okla., has decided upon the expenditure of $7000 for additional equipment for its waterworks and electric light plants.

A waterworks plant will be built at Mounds, Okla., by the municipal authorities. The mayor should be addressed.

About $15,000 will be expended by the city of Grandfield, Okla., on waterworks plant, etc., under the direction of the mayor.

C. S. Gibbons, of the Baldwin Standing Grain Thresher Company, Nickerson, Kan., is reported to have plans for the equipment of a plant for the manufacture of threshers.

The Comanche Light & Power Company, Lawton, Okla., will reconstruct its building and remodel its electric plant. Albert H. Keys is local manager.

The Patterson Light & Power Company, Patterson, La., is in the market for one 3-phase, 2300-volt, 75-kw. alternating current generator direct-connected to engine, with auxiliary equipment, etc.

The lumber mill of the St. Tammany Lumber Company, Ramsay, La., has been burned with a loss of $100,000. The plant will be replaced at once, it is stated.

John H. Bernhard, vice-president of the Alabama & New Orleans Transportation Company, who has plans for a floating dockyard, is preparing for the construction of special equipment, tools, etc., all to be made from special designs. The plant cost is estimated to total about $500,000.

James Rauch and Emile Aubert, Abita Springs, La., will equip a public lighting plant.

Wheeling

WHEELING, W. VA., June 15, 1914.

The local market remains unchanged. A noteworthy inquiry is that of the National Interior Finish Company for boilers and 22 wood-working machines.

The National Interior Finish Company, Huntington, W. Va., manufacturer of flooring, moulding, etc., will take sealed bids until June 20 on two 72-in. x 18 ft. return tubular boilers, steel cased, and on 22 wood-working machines. E. M. Byrne, Jr., is general manager.

The Keystone Wagon Company, Keystone, W. Va., was incorporated with $10,444 capital stock by C. C. Hale, W. F. Stuart, V. M. Parker, and others.

The Bluefield Hardwood Mfg. Company, Bluefield, W. Va., was incorporated with $50,000 capital stock by E. E. Carter, C. B. Bell, F. O. Barnes, and others.

The H. E. Jackson Carriage Company, Clarksburg, W. Va., has been purchased by Anthony Schulte, Ray Michaels, James Shields, and others, who will operate a carriage and automobile factory.

The Stephenson Lumber Company, Charleston, W. Va., will establish a large sawmill near Daisy, Ky.

The Crescent Window Glass Company, Weston, W. Va., will build an addition, doubling the capacity of the plant, at a cost of $80,000.

The Central South

LOUISVILLE, KY., June 16, 1914.

Improved crop conditions as the result of general rains which broke a long continued drouth form the best feature of the market situation. Actual business booked during the past week has not been large, though prospects remain relatively good. A considerable number of new factories are going up in this section, but most of them are comparatively small in size and take only a limited amount of equipment. Few enlargements or replacements are being made, and this is holding down the amount of new business. Power equipment men are getting more trade in proportion than makers of special machinery, demand for the latter being quiet. With business at large improved by good crops, however, there is no reason why the demand for machinery should not be considerably strengthened.

Automatic machinery, including turret lathes and other machine tools, will be purchased by the Universal Swing Joint Company, Ninth and Jefferson streets, Louisville. F. W. Maury is vice-president and John H. Hile secretary and treasurer. The company makes a flexible steam joint.

The factory of the William Klerner Furniture Company, New Albany, Ind., was damaged by fire to the extent of $20,000. Arrangements are now being made to repair the building and replace the burned machinery.

An addition to the handle plant of Burleigh & Sons, Eddyville, Ky., will be built and wood-working machinery installed.

The Star Foundry Company, Covington, Ky., stove manufacturer, will build an addition to be used for molding work. It will be of concrete, brick and steel.

The plant of the S. F. McCormick Lumber Company, Lexington, Ky., recently destroyed by fire will be rebuilt and re-equipped. About $25,000 of machinery will be required.

A company is being organized at Paducah, Ky., to manufacture hardwood flooring. A building has been leased, and the purchase of power and wood-working machinery will be arranged for shortly. The Commercial Club, Paducah, Ky., may be addressed for details.

The Louisville & Nashville Railroad Company is planning the establishment of a round-house, machine shops and other facilities at Lexington, Ky., but is not ready to announce the date for taking bids on the buildings or equipment. The general offices are in Louisville.

The Illinois Central Railroad, 135 Park Row, Chicago, is reported to have decided on the establishment of large repair shops at Paducah, Ky.

E. L. Greene, Springfield, Ky. Power equipment, an air compressor and special machinery will probably be purchased.

The Public Service Company of Western Kentucky, Fulton, Ky., has been incorporated with a capital stock of $140,000 by J. H. Boughton, W. C. Morehead and H. L. Lowe and in addition to the consolidation of Fulton and Hickman plants will also equip other plants in nearby cities, it is announced.

Prather Brothers, Georgetown, Ky., are planning the establishment of a factory there or in Cincinnati, Ohio, for the manufacture of a demountable wheel for use on Ford automobiles. They have sold their machine shop and garage at Georgetown to R. M. Holland.

C. C. Waller, McDermott, Ohio, will establish a limestone quarry at Bowling Green, Ky. The plant will require buildings and equipment which will cost $100,000.

Gibson & Son, Mayking, Ky., are reported in the market for a planer, a matcher and a moulder for a woodworking plant.

Stave and heading mills of considerable capacity are to be installed in the vicinity of Whitesburg, Ky., by the Louisville Cooperage Company, Louisville, Ky.

C. E. Webb, Fulton, Ky., who operates a foundry and machine shop may purchase some machine shop equipment.

The woodworking plant of Egburt & McNaughton, Madison, Ind., manufacturers of pins and brackets for telegraph lines, which was burned recently with $15,000 loss, will be rebuilt. Power and woodworking equipment will be needed.

The Tennessee Cooper Company, Ducktown, Tenn., is beginning the erection of a new electric power plant, etc., of concrete and steel construction.

The city of Nashville, Tenn., has appropriated $2000 for the purchase and installation of an electric pump for the waterworks department.

The Newburger Cotton Company, Memphis, Tenn., will equip a cotton compress to cost about $30,000.

The Bays Mountain Electric Company, Jasper, Tenn., has been incorporated with $25,000 capital stock by Joseph Burger, J. L. Clark, and others.

Hoshall, Simmons & Co., Memphis, Tenn., are in the market for some used wood-working machinery, including a rounding and cornering machine.

The Weidlich-Simpson Pen Company, Cincinnati, Ohio, is reported to be planning the removal of its factory to Nashville, Tenn. E. M. Simpson is president.

A general repair and machine shop is being established at Nashville, Tenn., by the St. Bernard Mining Company, Earlington, Ky. Equipment will be purchased through its Nashville branch.

Birmingham

BIRMINGHAM, ALA., June 15, 1914.

There has been some trading in future delivery of mining machinery including engines and boilers as well as pumps and electrical apparatus, but spot business is not large with the exception of small factory demand. The structural trades immediately in and around the Birmingham district, where construction of various kinds continues in a really extensive way, are doing some buying. There will be an early increase in the demand from the railroads, especially the Southern Railway which is building a $1,500,000 yard, roundhouse, etc., at Birmingham.

The Tennessee Coal, Iron & Railroad Company announces officially that it will shortly build at Ensley a steel and concrete plant for the manufacture of basic slag fertilizer after the German or Thomas process. Large bins are also to be built. Experiments at Ensley have demonstrated, according to officials of the company, that the slag there will work into a better quality than the German product.

The Valley Creek Cotton Mills, Selma, Ala., will be enlarged.

The Marble City Quarry Company, Sylacauga, Ala., has begun the opening of a marble quarry and will install machinery.

The Anniston Yarn Mill, Anniston, Ala., will duplicate the present plant.

The city of Girard, Ala., has authorized the issue of $20,000 of bonds for waterworks improvements.

The city of Phoenix City, Ala., has voted $15,000 of bonds for waterworks improvements.

The city of Manatee, Fla., has voted to install a water and sewage system.

J. F. Corbett, clerk of the board of bond trustees, Punta Gorda, Fla., will receive bids until June 30, for equipping an electric light plant.

Texas

AUSTIN, TEXAS, June 13, 1914.

An improvement in the machinery and tool trade and general business conditions is to be noted all over the State. The cotton and corn crop situation is much better than a week ago. The wheat harvest is in full blast and the money which the crop is bringing and will bring in will find its way largely into business channels.

The Pier Railway Company, Port Arthur, will construct an electric power station. K. M. Smith is interested.

The Central Railway of Texas, now being promoted by L. E. Walker, Austin, and associates, has decided to locate its general machine shops at Belton. It is stated that the construction of the road has been financed in England and Belgium.

The Texas Southern Electrical Company, Boston, Mass., has purchased the rights and franchises of the Cuero Light & Power Company for the construction of a series of dams across the Guadalupe River and the establishment of hydro-electric stations. The company also purposes to construct an extensive system of interurban electric railways, to connect the different towns where its holdings are located.

The Fowlerton Water Supply Company, Fowlerton, will construct a waterworks plant. C. S. Fowlerton is interested.

The South Texas Cotton Oil Company, Houston, has increased its capital stock from $60,000 to $125,000. It will make improvements to its cotton-seed oil mill.

It is announced by the Gulf Pipe Line Company, Beaumont, that it will construct an oil pumping station, unloading docks and other improvements on the San Jacinto River, near Lynchburg. The cost of the proposed improvements will be about $250,000.

C. E. Baudisch, San Antonio, and associates, will construct a plant for the manufacture of bricks.

F. W. Schuerenberg, Brenham, will enlarge his woodworking plant.

Roy Campbell, San Antonio, and associates, are arranging to construct four plants in southern Texas for pre-cooling vegetables for shipment to market. Considerable machinery will be required.

The Corpus Christi Cotton Oil Company, Corpus Christi, has been organized with a capital stock of $80,000 for the purpose of manufacturing cotton-seed oil. W. E. Pope, J. C. Baldwin and J. C. Hardison are the incorporators.

The Trinity Compress Company, Fort Worth, has taken out a permit to construct a cotton compress to cost $55,000.

Armour & Co., Chicago, Ill., have selected a site at Houston for its proposed fertilizer manufacturing plant.

The Interstate Mfg. Company, San Antonio, has been organized to manufacture a cotton cleaning device. M. F. Mueller is interested.

The Gafford Culvert & Machinery Company, San Antonio, which has a capital stock of $25,000, will construct a plant for the manufacture of road machinery, metal culverts and silos. Earle R. Gafford, Herbert Saxton and E. H. Powell are interested.

The Rio Grande Public Service Corporation, McAllen, has been organized to construct and operate public utility plants. It has a capital stock of $80,000. R. L. Lewis, T. J. Powell and D. W. Glasscock are the incorporators.

The Houston Electric Company, Houston, has increased its capital stock from $4,000,000 to $6,000,000. It will make improvements to its property in Houston.

The Pacific Northwest

SEATTLE, WASH., June 9, 1914.

Harvest activities still give rise to a good volume of miscellaneous business, principally of a small nature but very encouraging in the aggregate. There is also a fair scattering of mill and logging equipment orders, but otherwise the machinery trade shows little life. Indications for the future, however, are becoming steadily better. Conditions in the interior are favorable for a rapid increase in important development work, which has been somewhat retarded for the last year. The spring export business has been heavy, and there is more tonnage under charter for new-crop grain than for several years. The oriental steamship lines continue to take out large machinery shipments. Large building and construction contracts are more numerous, and more activity is expected in contractors' equipment.

The Monroe Water Company, Seattle, has been formed with a capital stock of $100,000 by Sidney Marshall, H. A. Goodfellow and E. E. Barnham.

The Staub Pulp Paper & Lumber Company, Spokane, Wash., has been incorporated by C. F. Young, A. E. Gallagher, L. H. Brown, and others. The company is capitalized at $4,000,000.

The city of Ellensburg, Wash., will receive bids in the near future for a duplex pump and auxiliary machinery.

The Anaconda Copper Mining Company, Butte, Mont., recently suffered a loss by fire of $35,000, including the destruction of a mill, driers and blacksmith and carpenter shop. It will rebuild at once.

Link & Haire, architects, Lewistown, Mont., announce that plans for the mill buildings of the Montana Lumber Company, of that city, have been completed, and bids will soon be called. The estimated cost is $25,000.

J. B. C. Lockwood, consulting engineer for the port of Portland, Ore., will draw plans for an electric hydraulic dredge for the Tacoma Dredging Company.

Manager Butler, of the Latour Creek Railroad, Kellogg, Idaho, is authority for the statement that a large sawmill will be constructed during the summer at the junction of the new railroad with the Oregon, Washington Railroad and Navigation Company's line.

Bids will be received by S. L. Powers, town clerk, Choteau, Mont., until 6 p.m., July 6, for a sanitary sewer and disposal plant.

H. H. Clifford, Seaside, Ore., is making arrangements to build a shingle mill.

H. H. Haskell has opened a store at 229 Pine street, Portland, for the Pacific Mill & Mine Supply Company, San Francisco, Cal.

Eastern Canada

TORONTO, ONT., June 13, 1914.

The Rugg-Ball Mfg. Company, Ltd., Sherbrooke, Que., will erect a plant for the manufacture of rakes, shovels, etc., at Ayer's Cliffe, Que., in the near future.

L. J. Lawson, Windsor, Ont., is contemplating the erection of a structural steel plant on McDougall street, in the No. 1 factory district.

The Canada Casket Company, Wiarton, Ont., will soon commence the erection of its new factory.

The Union Twist & Drill Company, Rock Island, Que., will erect a machine shop.

The Sherbrooke Machine Company, Sherbrooke, Que., will erect a machine shop.

The ratepayers of Owen Sound, Ont., passed a by-law to grant a bonus of $10,000 a year for 20 years for the construction of a shipyard and drydock to be located there, and to guarantee the bonds of the Union Cement Company to the extent of $60,000.

The Harvey National Supply & Mfg. Company, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by J. M. Harvey, W. W. Stoddart, W. P. Stoddart, and others, to manufacture stoves, household furniture, etc.

The Oakville Basket & Veneer Company, Ltd., Oakville, Ont., has been incorporated with a capital stock of $100,000 by J. M. Bullen, F. H. Hurley, R. G. Agnew, and others, to manufacture baskets, boxes, etc.

The Davie Shipbuilding & Repairing Company, Ltd., Lauzon, Que., has been incorporated with a capital stock of $500,000 by George D. Davie and Alison C. Davie, Lauzon, Thomas A. O'Neill, and others, of Quebec, to manufacture, build and repair ships, barges, dredges, etc.

The Canadian Hart Accumulator Company, Ltd., St. Johns, Que., has been incorporated with a capital stock of $300,000 by George W. Kidd, Wansted, England; Edward J. Clark, Leytonstone, England; Arthur R. Slipp, Fredericton, N. B., and others, to manufacture apparatus used with electricity, gas, steam, etc.

The Canadian General Fire Extinguisher Company, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by J. A. Kent, J. H. MacDonald, C. W. Thompson, and others, to manufacture fire protection apparatus, etc.

The Stockwell Motors, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by F. B. Stockwell, E. E. Leger, H. E. Walker, and others, to manufacture automobiles, trucks, etc.

The Montreal Terra Cotta Company, Ltd., Montreal, has been incorporated with a capital stock of $300,000 by L. Joseph, Maisonneuve, Que., and others, to manufacture brick, terra cotta, etc.

J. C. Pennington, Windsor, Ont., is preparing plans for the Dominion Stove Company's factory to be erected at Kingsville, Ont.

Western Canada

WINNIPEG, MAN., June 12, 1914.

The Conley Frog & Switch Company, Ft. William, Ont., has commenced operations on the erection of its plant. This will be one of the finest manufacturing plants at the head of the lakes. E. H. Baumgarten is local manager.

It is announced that the Grand Trunk Pacific Railway Company will construct a large coal-handling plant at Ft. William, Ont., to cost $1,250,000.

The Coquitlam Shipbuilding Company, Coquitlam, B. C., will make additions to its plant to cost $25,000.

The Interior Hardwood Finishing Company, Ltd., Duncan, B. C., will erect a factory.

Messrs. Stewart, Moore & Wright, Vancouver, B. C., have taken over the D. & H. Brassworks Company, Sapperton, B. C. Two acres of land have also been purchased at New Westminster, B. C., and a foundry and steel plant will be erected there.

The King Lumber Company, New Westminster, B. C., will erect a lumber mill within two months with a capacity of 10,000 ft. per day.

The sawmill of the Sullivan Brothers, Cloverdale, B. C., which was recently destroyed by fire, with a $25,000 loss, will be replaced at once.

The Mainland Iron Works, North Vancouver, B. C., according to statements made by R. Fowler, the president, is considering the purchase of a large section of water frontage east of Moodyville, where it will move and enlarge its foundry.

A large ice skating rink, costing more than $100,000, will be constructed in Seattle by Joseph Patrick and Frank A. Patrick, Vancouver, B. C. The building will be of concrete and steel truss construction, 145 x 256 ft. Ice-making machinery will be required.

The Metal Shingle & Siding Company, Ltd., Regina, Sask., is calling for bids for the erection of a factory, etc.

The Automatic Springless Faucet Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $100,000 and will erect a plant.

The Valley Lumber Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $50,000 to operate lumber mills, etc.

The Prince Albert Lumber Company has purchased the Big River Lumber Company and will reconstruct the mill and planer at Big River, Sask., which were destroyed by fire last fall. A. L. Mattes is manager.

Government Purchases

WASHINGTON, D. C., June 15, 1914.

The U. S. Reclamation Service, 605 Federal Building, Los Angeles, Cal., will receive bids until 2 p. m., July 14, for furnishing one variable head turbine for the Salt River project, Ariz.; until 2 p. m., June 22, for furnishing under advertisement 304, one horizontal turbine water-wheel-driven centrifugal pump, with 5-kw. generator, for the Shoshone project, Wyo.

Sealed proposals will be received at the office of the light house inspector, Boston, Mass., until 2 p. m., June 23, for furnishing one oil engine.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until June 26, schedule 6897, for one motor-driven 3-post radial drill, four motor-driven wall-type radial drills, one motor-driven drilling and tapping machine, one motor-driven plate-edge planing machine, one motor-driven horizontal punch, four motor-driven single and vertical convertible punches or shears, one compression type pneumatic riveter, and one motor-driven gate type shear, all f.o.b. works; schedule 6898, for two rectangular lifting magnets, one 12-ft. 6-in. power brake, one set of 10-ft. power bending rolls, and one gate shear, all three complete, with motor and controlling appliances, all for Brooklyn; schedule 6898, for one 5-ton hydraulic rising jib crane, one 12-in. motor-driven hand jointer, one 25-spindle combination dove-tailing machine, one motor-driven plate-jogging machine, and one 84-in. gate shear, all for Philadelphia; schedule 6898, for two buffing and polishing lathes and one balancing tool, both f.o.b. works; schedule 6898, for one radial drilling and countersinking machine complete, for Norfolk; schedule 6900, for two 3-motor electric traveling cranes of 15-ton capacity, one 3-motor electric traveling crane of 5-ton capacity, and one 2-motor 3-ton electric revolving pillar crane, all for Brooklyn; schedule 6899, for three 4000 and 6000-lb. air hoists, f.o.b. works; until July 7, schedule 6925, for eight hydraulic turbine tube cleaners for 2-in. boiler tubes, for Brooklyn; schedule 6902, for one motor-driven gear-head, 60-in. swing engine lathe for Boston; schedule 6924, for four 6-in. handy-billy pumps complete for Brooklyn; until July 14, schedule 6920, for three 14-ft. x 6-ft. bed engine lathes for Annapolis; schedule 6919, for one horizontal split-case double suction volute pump for Norfolk; until July 21, schedule 6917, for one water-tube boiler complete for Mare Island.

Bids were opened June 10 by the Commissioners of the District of Columbia for furnishing one universal milling machine for the fire department repair shop as follows:

Fairbanks Company, New York City, $1799.

Niles-Bement-Pond Company, New York City, $1854, $1749, $1796, $1703, $1749 and $1645.

Niles-Bement-Pond Company, New York City, $1681; without equipment, $1212.

Hill, Clark & Co., Boston, $1790; for center gears add $75.

Kemp Machinery Company, Baltimore, $1597, $1617, $1699 and $1719.

Aumen Machinery Company, Baltimore, $1581.60, $1483.26, $1502 and $1464.

Brown & Sharpe Mfg. Company, Providence, $1889.76.